Three Essays on Livelihood and Development in Indonesia

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Declaration

Declaration

This thesis is my own work.

The data used in Chapter 2 come from primary data collection. The fieldwork for the data collection was supported by grants from Australia Indonesia Center (AIC) and Indonesia Endowment Fund for Education (LPDP) through Indonesia Presidential Scholarship PhD Thesis Grant 2015. The data used in Chapter 3 come from Rural-Urban Migration in China and Indonesia (RUMiCI) Project. The data used in Chapter 4 come from two sources: the National Socio-Economic Survey (SUSENAS) and the Indonesia Family Life Survey (IFLS). The access of SUSENAS data is through Australian National University, and access to IFLS is from the public domain of IFLS. The views expressed in this thesis are those of the author. They are not necessarily those of AIC, LPDP, or other funders.

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Abstract

This thesis compiles three papers on livelihood and development in Indonesia. The first quantifies the causal impact of having an alternative livelihood on household food security for people living on small Indonesian islands. The geographical context is chosen to acknowledge the severity of the food insecurity problem that they face. The empirical identification employs a laboratory experiment in the field to resolve the difficulties in conducting a full randomised control trial in small and remote islands. Results show that an additional income framed as from an alternative livelihood reduces expected household food insecurity. For every US$7.5 increase in permanent household weekly income, the food insecurity index is lowered by 2.3 points on a 0–15 scale. The magnitude of causal impact implies that a more substantial amount of intervention is needed than the existing cash transfer to entirely eradicate the feeling of food insecurity in the small Indonesian islands.

The second paper examines economic assimilation profiles of Indonesian rural–urban migrants, which can be viewed as assessing the outcome of a livelihood diversification strategy. The empirical assessment utilises the feature of individual longitudinal data of the Rural–Urban Migration in China and Indonesia (RUMiCI) dataset in a novel approach for the context of the case study. The Indonesian context is chosen to add empirical finding to countries such as China and Vietnam, that have more restrictive policies than Indonesia. The focus of analysis is earnings as well as mental health, which is also considered novel for the context of the case study. Results demonstrate that internal Indonesian migrants do not experience earnings penalties subsequent to their arrival in urban areas. Indeed, their earnings persistently overtake those of urban natives over time. This assimilation profile suggests that internal migrants in a liberal internal migration institutional setting tend to be positively selected such that they outperform the urban native

in the labour market. However, a series of further estimates also identifies that the migrants experience a worsening mental health condition subsequently. The inferior mental health outcome seems to be explained by decreasing social support over time rather than the number of hours spent at work. On combining the earning assimilation profile and mental health assimilation profile, it can be inferred that although these migrants are positively selected in the labour market, they are quite prone to depressive symptoms.

Given the importance of social capital in livelihood development, the third paper investigates the potential role of education as a means for social capital formation. The paper argues that civic education might matter in shaping individual social capital skills following an appropriate period of exposure of individuals to such education in their lifecycle of social skills development, that is, adolescence. Specifically, the identification strategy exploits a natural experiment of state ideology courses in Indonesia (known as P4), which was discontinued unexpectedly owing to *the Reformasi* in 1998. However, the regression discontinuity design identifies no significant statistical difference in terms of social skills and a set of social capital measures between similar cohorts exposed and not exposed to the P4 programme. The programme only had a minor effect on cognitive score related to the courses. The results are consistent on using various robustness checks. The analysis concludes that the role of state ideology with indoctrination of the type observed in Soeharto's Indonesia to develop social capital element at the individual level is limited.

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Chapter 1

Introduction

1.1 Livelihood and development

A means of securing both living and livelihood is the underlying common topic of three significant chapters in the present thesis. Each chapter, however, has its theme and independent from the other. They offer a new context or a different technique or a combination of both aspects added to literature on economic development. The themes of the chapters consist of income shock and food security on the small islands (Chapter 2); economic assimilation of rural-urban migrants in non-restrictive policy setting (Chapter 3); and individual social capital formation through education in an authoritarian regime (Chapter 4).

Those three empirical chapters used Indonesia as a study case because the country provides a unique setting for the empirical investigations of each chapter. Its socially diverse population and geographical shape, as the largest archipelagic country in the world, are the distinct background to study food insecurity issue, consequences of internal migration and social capital formation debate. The 'islandness' setting is very relevant for studying food security issue for people living in the small islands (Chapter 2). The archipelago setting is essential in understanding the consequence of having an open internal migration with high domestic migration costs (Chapter 3). The diverse social environment is relevant for analysing the social capital formation-issue in Chapter 4.

Chapter 2 is concerned with the relationship between income shock and the feeling of food insecurity as there has been a long tradition of examining the link-

age between income and health (Deaton, 2003; Preston, 1975). This chapter fits into the literature stream and focuses on the microeconomic analysis. Its distinct contribution is that it focuses on establishing a causal relation between a positive income shock and the individual perception of food insecurity improvement. Moreover, the empirical exercise uses a field experiment which differs to the method used in the existing studies as it applies the population context. It is applied to a unique framework of people living on small islands and facing vulnerable livelihood prone to social conflict. The findings are expected to add new perspectives to the empirical analysis of causal inference on the effect of income on food security outcome.

Chapter 3 deals with the effect of time on earnings and mental health of the rural-urban migrants. The study revisits the economic assimilation of migrants' literature pioneered by Chiswick (1978) and Borjas (1985). The new proposed context is the internal migration analysis occurring in a non-restrictive policy regime and facing a high fixed cost of migration due to the nature of the archipelagic nature of the country. The estimate utilises an individual panel data with fixed effect technique. The empirical analysis is applied to newly available longitudinal data on internal migrants seeking a better livelihood through rural-urban migration, leading to movements from rural areas to one of the four major Indonesian cities. The present chapter also highlights the relationship between economic assimilation and general well-being, measured through the mental health status of the population. The findings are expected to add variety of evidence to the economic absorption of internal migrants' literature.

Chapter 4 examines the consequence of the exposition to special education under the Soeharto government in Indonesia. The chapter revisits the literature on non-market effect or social return of education (Haveman and Wolfe, 1984) and the technology of skills formation (Cunha and Heckman, 2007). The study mainly focuses on a particular type of education, namely state ideology indoctrination courses. It utilises the natural experiment of the discontinuation of massive programs. The findings are expected to shed light on the debate aiming to design an appropriate intervention plan to build social capital at the individual-level through education.

1.2 Focus on Indonesia

The full-fledged empirical analyses in the present thesis solely focus on Indonesia. Indonesia was chosen as a case study for several reasons. The common underlying motivation in picking Indonesia as a case study is its unique setting for each empirical analysis. For instance, in Chapter 2, Indonesia is an appropriate setting as a sizeable archipelagic nation with food insecurity diversity. Besides, the policy-setting about food security also deserves attention since the "food sovereignty" view tends to undermine economic food access for the poor (Simatupang and Peter Timmer, 2008).

In Chapter 3, Indonesia, with less restrictive policy towards internal migration, offers a variety of evidence for a comparative analysis with countries having a more stringent policy, such as China and Vietnam. Given the similarities between those countries in terms of urbanisation rate and population size, Indonesian migrants could have different economic outcomes compared with migrants in China as a consequence of different institutional setting.

In Chapter 4, Indonesia's experience of having a dictatorship regime implementing education-specific training is very relevant to the discourse on social capital formation. Notably, the setting allows us to study social capital formation at the individual level as the nature of the event suggests. This chapter focuses on the individual level, which differs from that of the significant existing empirical works using the community level as the unit of social capital formation.

1.3 Key analytical questions, method, and results

1.3.1 Chapter 2

This chapter attempts to answer two technical questions: how to establish a causal link between a positive income shock and household food security; and how much a one-Rupiah increment contribute to improving food security status. The empirical approach adopted is a laboratory experiment in the field. The experiment allows for designing an appropriate treatment framed as an event of having additional income from an alternative livelihood. The use of a sample consisting of actual

inhabitants of small islands permits precise impact evaluation, given that the best effects in the context of location are known. The results showed a moderate impact on the context of small island communities living in the Kei Islands. Every US$7.5 increase in weekly household income lowers the food insecurity index by 2.3 points on a 0–15 scale. The finding suggests that a positive income shock is a real need to reduce the feeling of food insecurity for the subpopulation considered in this study.

1.3.2 Chapter 3

This chapter questions whether the rural residents moving to a city succeed in improving their livelihood or not. There are few specific analytical questions that need to be asked: Do the earnings of Indonesian rural-urban migrants assimilate those of urban natives? How fast does the convergence, if any, occur? Do they conform to the immigrant assimilation hypothesis (IAH)? What is the correlation between economic assimilation and mental health conditions? Does any specific factor exist to explain the yearly mental health condition since migration?

A standard estimating equation for testing the IAH is used to answer those questions. Unlike the impact evaluation of migration comparing migrants with their counterparts in the migrant-sending region, economic assimilation by purpose compares migrants with the population in the migrant-hosting region. Thus, the specification mainly addresses the potential bias originating from the cohort effect and individual heterogeneity. The cohort effect bias emerges because the type of migrants in the cohort differs in each migration wave. The term individual heterogeneity refers to differences at the individual level. The estimates utilise panel data at the individual level provided by Rural-Urban Migration in China and Indonesia (RUMiCI) surveys with fixed-effect technique.

Result shows that the internal Indonesian migrants in four cities have persistent higher incomes relative to non-migrants subsequent to their arrival in the cities. This finding contradicts the standard profile predicted by the IAH in which immigrants start with an earning penalty and then gradually catch up with the earnings of urban natives. However, the economic assimilation profile is accompanied by a persistent worsening of mental health condition. It implies that the migrants in the setting of a less-restricted internal migration policy tend to be pos-

itively selected from the rural areas in the urban labor market. Although these migrants are positively selected, as regards the other trait, they are prone to depressive symptoms. In the Indonesian case, the estimates suggest that the pressure on their mental health condition arises from reduced social support rather than extended working hours relative to the natives. The overall economic assimilation profile analysis results add varieties of evidence for comparative analysis to other places in which the rural-urban migrants face more restrictions, such as China or Vietnam.

1.3.3 Chapter 4

This chapter asks whether or not education forms individual social capital. The empirical analysis exploits the natural experiment of the discontinuation of the state ideology indoctrination courses in Indonesia (1998) owing to the *Reformasi*. In doing so, it considers the following: Were the cohorts exposed to state ideology courses during the Soeharto era statistically different from the un-exposed cohorts with regards to social skills and social capital measures? The identification strategy employs a regression discontinuity design (RDD). The RDD setting exploits the sudden discontinuation of the P4 program in 1998 and uses the last cohort to be exposed to the program in 1998 as the cut-off.

The analysis revealed no intermediate effect related to the differences in the latent social skills of the groups. However, there was a minor effect on the cognitive measure associated with the courses. Consistent with this result, no higher-order effect was found with regards to the differences in social capital measures of the cohorts. The results are robust to various robustness and falsification tests. The heterogeneity impact analysis showed that there could be a backlash effect eroding the program effect. The mentioned effect was attributed to the aspiration to abandon all life aspect related to the New Order Era after the *Reformasi*. Besides, support from the environmental condition could make the effect of the program last longer. For example, living in a rural area with a homogeneous environment seems to be an ease for the individual in maintaining program effect on trust. Overall, the findings suggested that specific education with the type of indoctrination as experienced in Indonesia (Soeharto era) has a limited role in developing social capital

at the individual level.

1.4 Contributions

Chapter 2 is innovative in that it focuses on small island communities within a country rather than small-island communities at the country level as insignificant studies on the small island developing states (SIDS), such Briguglio (1995), Douglas (2006), Easterly and Kraay (2000), Guillotreau et al. (2012), McGillivray et al. (2008), Read (2004), and Read (2010). Such a focus shift is crucial in understanding the intra-subnational complexity problem of capabilities and entitlements. Macro-level studies of SIDS have yielded two possible policy recommendations, namely strengthening the engagement of micro and small states in international trade and providing foreign aid to foster sustainable livelihood in those states. Those recommendations might not be applicable to small island communities within a nation. The field experiment also emphasises the importance of alternative livelihoods or other interventions, such as cash transfer, to ensure food security in the small island context. Moreover, the experiment provides the magnitude or dosage of the causal link of additional income from this intervention on reducing the household expectation in experiencing hunger. The practical use of the results is, for example, to provide a revised amount of uniformly provided cash transfer in Indonesia if the government takes into account malnutrition and food insecurity reduction as the goal for such intervention. Currently, the government is considering shifting food aid from rice to money (cash).

In Chapter 3, the study revisits the empirical work on internal migration economic and mental health assimilation. To the best of our knowledge, there is no study to estimate the economic assimilation or rural-urban migrant in Indonesia using longitudinal data. Therefore, the present study compares the analysis to other Asian countries such as China. The economic assimilation analysis differs from Zhu (2016) with the Chinese case in the sense that this study explicitly tests the time effect on the wage gap between rural-urban migrants. Besides, the environment for migrant also contrasts those of restrictive system in China. As for the mental health analysis, the examination advances the study of Lu (2010a) for

Indonesia. The analysis differs from Lu (2010a) in as it uses urban non-migrant as the control group making the economic assimilation analysis instead of the impact of migration as in Lu (2010a).

In Chapter 4, a different and fresh perspective on the *Reformasi* effect in Indonesia is offered in terms of decentralisation, family planning, and the post-economic crisis (see for example Molyneaux and Gertler (2000); Parinduri (2017); Duflo (2001); Waters et al. (2003)). In particular, this research investigates a natural experiment related to the Indonesian reform in 1998: the discontinuation of the state ideology courses in Indonesia, namely the P4 program. The interruption offers an RDD setting to exploit the long-term effect of the program. This chapter argues on the importance of the application to the social capital formation and the uniqueness of the exposure period of adolescence, which is crucial for non-cognitive formation in an individual's lifecycle. The chapter provides an impact evaluation of social capital formation at the individual level through specific education. The results could serve as the basis for cost-benefit perspective in comparing the effectiveness in developing social capital relative to community development approach or any other means, such as general education.

1.5 Thesis structure

This thesis has five self-contained chapters. Chapters 2–4 are the significant chapters and present the core of the research. Chapter 2 establishes the causal impact of having additional income on perceptions of food security at the household level of inhabitants of specific small islands, the Kei Islands of Maluku, Indonesia. Chapter 3 examines the economic assimilation and its consequence on the mental health of the rural-urban migrants in four major Indonesian cities. Chapter 4 investigates the role of civic education in creating the element of social capital at the individual level by exploiting the 1998 discontinuation of the P4 (state ideology courses) in Indonesia given the critical nature of the social capital for livelihood development. Chapter 5 concludes by highlighting the contribution, discussing the implications of the findings of this thesis in policymaking, and presenting possible further research directions.

Chapter 2

Alternative livelihood for food security

Abstract

Communities living in small and remote islands often have to deal with food insecurity. This chapter aims to assess the magnitude of impact of additional income earned from an alternative livelihood on the status of household food security in the short run. A random evaluation method is used to achieve this goal in the context of fishing communities in Kei Islands, Indonesia. The sample population lives in a lagging and geographically isolated region, facing limited livelihood options and food insecurity. The field experiment uses a random real stake that represents an alternative livelihood that could generate an additional income as the treatment and relates it to the changes in household perceptions of food security as the outcome measure. The results imply that higher weekly income enhances expected food security. An increase of Rp100,000 (US$7.5) in permanent household weekly income lowers the food insecurity scale by a factor of 2.3 out of 15. The magnitude effect implies that a much larger amount of cash transfer is needed relative to the existing national-level cash transfer programme.

2.1 Introduction

Global progress has been made to reduce hunger and malnutrition, yet around 800 million people remain food insecure in 2016 (FAO et al., 2015). An emerging framework to deal with the challenge is to acknowledge the food insecurity problem on a territorial basis and formulate appropriate policy responses (Organisation for Economic Co-operation and Development et al., 2016). Geographical concentrations for chronic food insecurity are primarily rural areas of developing countries. In particular, disadvantaged subnational regions are those such as a remote area or small islands with weak ties to the major market, which rely on subsistence activities (FAO, 2014).

Therefore, a low-income group living on a small remote island is among food insecure subpopulations. The modern food security concept requires the fulfilment of both food availability and food access for all people at all times (FAO et al., 2015), which is a requirement that is hardly realised for such a subpopulation. Food access is limited by the geographical remoteness of the islands. Often, the island population's economic access to food is hindered by poverty and subsistence livelihood from a marine resource or small-scale agriculture (Yamazaki et al., 2015).

The sustainable livelihood (SL) framework suggests three strategies for a household: (i) agricultural extensification or intensification, (ii) livelihood diversification, and (iii) migration (Scoones, 1998). The study in this chapter focuses on exercising the implication of livelihood diversification on food security for people living in a small and remote island. By such an examination, the resulting empirical findings are expected to serve as additional information for evidence-based policymaking.

The empirical analysis uses a case study of Eastern Indonesia. The samples are artisanal fishing communities living on the Kei Islands, which are small. Indonesia is an appropriate context since it is the largest archipelago and a developing country that has been facing persistent within-country food security disparity (Food Security Council et al., 2015). Moreover, the food policy at the national level is ambiguous in orientation, and hence, views as regard self-sufficiency and protection of the agricultural sector predominate. The policy results in high food prices and food insecurity of the poor, despite the country's claim of having a pro-poor food policy (McCulloch and Peter Timmer, 2008; McCulloch, 2008; Fane and Warr,

2008; McCarthy and Obidzinski, 2017). Eastern Indonesia is chosen since the region is known as the pocket of poverty and has lower economic growth relative to the national standard (Hill et al., 2008; Miranti and Resosudarmo, 2005).

For a household, food security is both the means and ends for livelihood. For an SL, food security needs to be achieved, which results in family members being in a productive state. Conversely, food security requires adequate economic access to food from a sustainable income. Given the nature of the bi-relationship between livelihood and food security, careful empirical work is needed to establish a causal effect of livelihood development on food security.

Accordingly, my study in this chapter employed a laboratory experiment in the field and applied a randomised evaluation to a sample of 534 households to establish the causal impact of additional income gained from an alternative livelihood on the status of household food security. As an outcome measure, the experiment uses recent, widely adopted tools to measure food insecurity at the household level, which rely on the hunger and food insecurity experience developed by the United States Department of Agriculture (Hamilton et al., 1997), namely the Household Food Security Survey Module (HFSSM). The use of the tools allows to not only gain a valid measure since it, in general, complies with traditional nutrition intake and anthropometry measures (Coates et al., 2003; Frongillo Jr, 1999; Jones et al., 2013; Studdert et al., 2001; Upton et al., 2016) but also is an efficient way of measuring food insecurity at the household level because it is recall based on experience. For the treatment, participants in the experiment were asked to play an alternative livelihood game in which a real stake was offered (Cameron and Shah, 2015) and framed as additional income generated by alternative livelihood opportunities.

The use of a laboratory experiment in the field combined with the adoption of HFSSM is a novelty of this chapter to resolve the difficulties in conducting a full randomised control trial in small islands and remote areas. The novel focus of this study is a population of artisanal fishing households that increasingly face a threat of declining incomes and loss of livelihood as a result of the depletion of fishery resources (Ainsworth et al., 2008), illegal fishing (Fox et al., 2009), and marine resource conflict among community members (Yamazaki et al., 2015). To best of my knowledge, this is the first study that uses a laboratory experiment in the field

randomised in such a context of the population to evaluate the impact on household food security of providing additional income through alternative livelihoods.

The finding suggests that providing additional income to households in the small-island fishing community improves the expected food security of the households and its impact is higher than that found in other studies. The result suggests that an increase in weekly household income of US$7.5, or about 21% cent of the average household weekly expenditure is, on average, associated with a 2.3-point decrease in the 15-item scale measuring food insecurity. This magnitude is moderately higher than in the result of (Loopstra and Tarasuk, 2013), who found that a $2,000 a yearly income gain, or 17% of annual household income, is associated with only a 0.29 point decrease in the same scale of measurement.

Moreover, the estimated results predict that the total amount of additional income required to fully alleviate the household experience of food insecurity in Maluku and East Nusa Tenggara provinces is Rp12 billion and Rp15 billion ($9.6 and 12 million) respectively. The finding provides key information about the dose of social assistance programmes that aim to improve the food security of small-island communities by providing access to alternative livelihoods and relaxing financial constraints of households for food consumption.

The rest of the chapters are organised as follows. Section 2.2 describes the context of the population of the study. Section 2.3 explains the field experimental laboratory design and estimation strategy. Section 2.4 presents the results and discussion. Section 2.5 concludes.

2.2 Context: small-island communities

Indonesia is an archipelago country with more than 17,000 islands, and most of them are small and remote, particularly those in Eastern Indonesia (Indonesia Statistics Agency, 2013). Small-island communities in Eastern Indonesia face two major impediments to improving the status of household food security regarding both the availability and accessibility of food. First, food availability is hindered by underdeveloped infrastructure and limited connectivity to major cities in the country. Returns on investment in transportation infrastructures in small islands

are known to be riskier than for other regions owing to the sensitivity to variable weather conditions and natural disasters, resulting in limited public and private involvement in improving food availability in the region (FAO et al., 2015). Public underinvestment in infrastructure for nation, including the eastern part, has been massive owing to the energy subsidy that crowds out public spending, whereas private investment has been hindered by a lack of coordination between line ministries, ministries of the central and local governments for the issuance of regulations to boost physical infrastructure (Sandee, 2016).

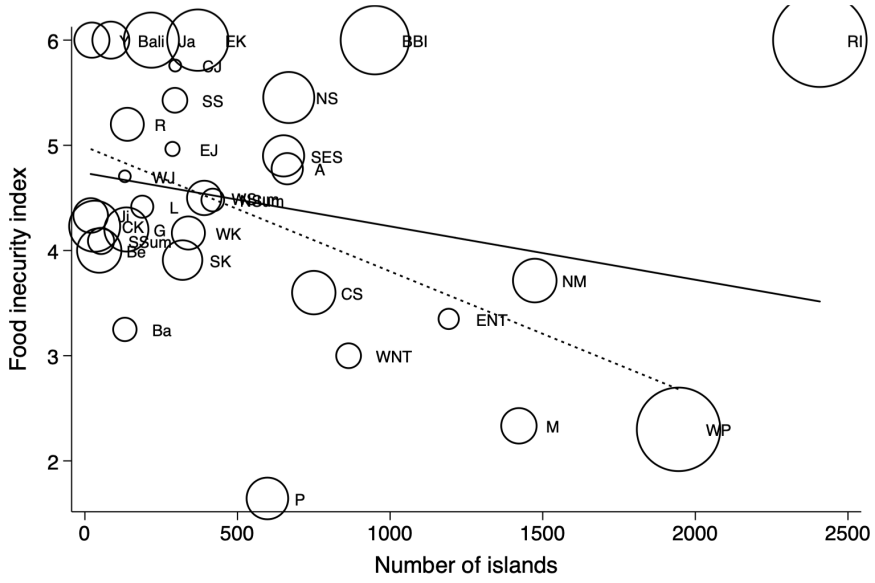


FIGURE 2.1 – CORRELATION BETWEEN NUMBER OF ISLANDS AND FOOD SECURITY AT PROVINCIAL LEVEL IN INDONESIA

Source: Author calculation based on Indonesian BPS (Bureau of Statistics) data and Food Security Council et al. (2015, page 152).

Legend: A = Aceh, Bali = Bali, Ba = Banten, Be = Bengkulu, Y = Yogyakarta, Ja = Jakarta, G = Gorontalo, Ji = Jambi, WJ = West Java, CJ = Central Java, EJ = East Java, WK = West Kalimantan, SK = South Kalimantan, CK = Central Kalimantan, EK = East Kalimantan, NK = North Kalimantan, BBI = Bangka Belitung Island, RI = Riau Island, L = Lampung, M = Maluku, NM = North Maluku, WNT = West Nusa Tenggara, ENT = East Nusa Tenggara, P = Papua, WP = West Papua, R = Riau, WS = West Sulawesi, SS = South Sulawesi, CS = Central Sulawesi, SES = Southeastern Sulawesi, NS = North Sulawesi, WSum = West Sumatra, SSum = South Sumatra, NSum = North Sumatra.

Note: Higher values in Y axes represents better food security.

About the accessibility of food at the household level, Eastern Indonesia, where

many small islanders live, is known as the pocket of poverty and driver of nationwide inequality (Akita and Alisjahbana, 2002). That is, economic access to required nutrition and healthy life for people living on the island has been hindered by poverty and limited livelihood options (Resosudarmo and Jotzo, 2009).

The persistence of high food insecurity for communities living on a small and remote island at a subnational level, with lagging social outcomes, is the interplay of high poverty incidence, limited food entitlement, and food insecurity (ESCAP, 2009). This study focuses on Maluku Province that has a remarkable trifecta of challenges for food security: (i) It is ranked among the provinces with lowest gross domestic capita per capita in Indonesia (Hill and Vidyattama, 2016); (ii) It faces severe food security vulnerability (Food Security Council et al., 2015); and (ii) It has many small islands, which implies limited physical connectivity.

At the national level, Indonesia is an example that having a large number of islands is a challenge for food security. A negative correlation exists between the food insecurity index and the number of islands at the province level (Figure 2.1). It exhibits a clear indication that economic access (income) and physical access to food are weaker in some remote islands. As a showcase, in Eastern Indonesia, the small islands of Maluku, North Maluku, East Nusa Tenggara, West Nusa Tenggara, and West Papua are in contrast to the small islands of Bangka Belitung Island and Riau Island in Western Indonesia, which have more opportunity to exploit the advantage of being located near Malacca Strait such as a greater involvement in international trade. The correlation line (dashed) becomes steeper when I exclude Bangka Belitung Island and Riau Island, which suggests that income (economic) access matters for food security.

For the low-income groups in these provinces, food may be physically present in the region, although not as much as in Western Indonesia, but it is not accessible for all subpopulations because of the limited financial capacity of some groups. Thus, the resource allocation of food at the household level will likely exhibit deprivation for some or inequality among the subpopulation members. Therefore, food security problem in the region is about food entitlement at the individual level.

This article specifically contributes to finding a solution to this problem by quantifying the causal impact of relaxing household economic access problems re-

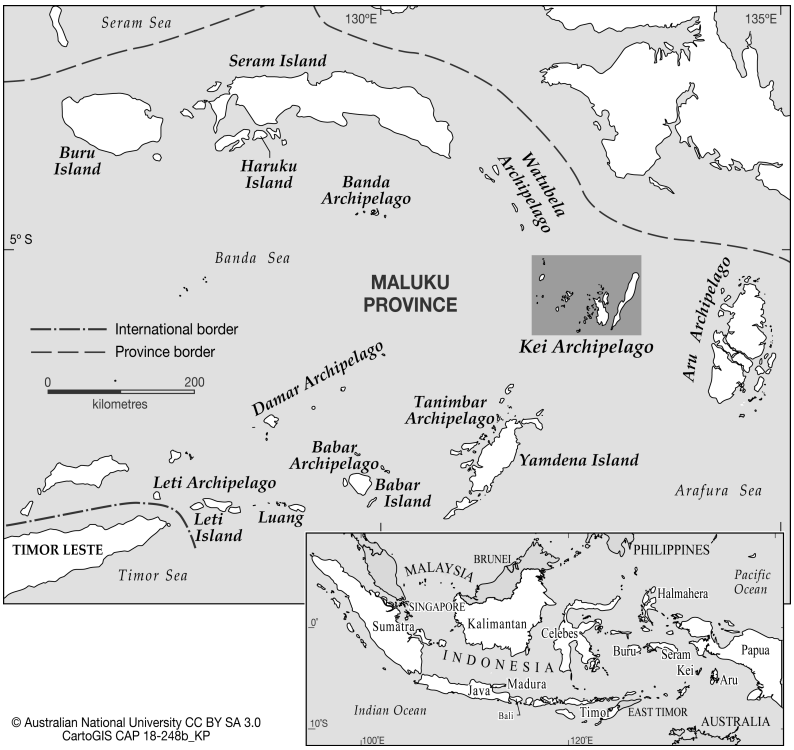


FIGURE 2.2 – LOCATION OF THE KEI ISLANDS
Source: CartoGIS Services, ANU College of Asia and the Pacific, The Australian National University

garding food security. Protecting the most vulnerable member of the household or society, including in terms of food security, is the most important determinant of household well-being (Dasgupta, 1995). The treatment in this study is best suited to two potential sources of income enhancements for vulnerable members of the community: (i) market base (additional income) and (ii) social safety net (cash transfer). The difference between the two is the time frame of the intervention. The former is more sustainable than the latter but needs a long-run time frame to be achieved. The latter is a more suitable than the former for a temporary and urgent situation, such as food price hike. In addition to the time frame, policymakers need to know the effects and extent of such effects on household food security resulting from relaxing the financial access to food based on a cost–benefit measure. Therefore, the relevance of this analysis is in determining the size or magnitude impact of monetary shock to household food security in this particular population context.

TABLE 2.1 – RESPONDENT DISTRIBUTION ACROSS VILLAGES AND DISTRICTS

District	Village	Number of samples
Maluku Tenggara District	Dian Pulau	31
	Dunwahan	94
	Sathean	80
	Sitniohoi	39
	Lairngangas	17
	Selayar	78
	Total	339
Tual City	Dullah Laut	93
	Pulau Ut	48
	Lebetawi	54
	Total	195

2.3 Field experiment

This study was performed in nine fishing villages from two districts in Kei Islands in the Maluku Province of Eastern Indonesia (Figure 2.3). The Kei Islands are chosen as the research site because they represent small and remote island communities in Eastern Indonesia. The remoteness of the Kei Islands is evident from the fact that they are about 551 km away from Ambon, the capital of Maluku Province, which consists of thousands of small islands (Figure 2.2). Ambon itself is about 2,404 km away from Jakarta, the capital of Indonesia. Food availability in the Kei Islands is hindered by underdeveloped infrastructure and limited sea transportation from Ambon and other major cities. Further, there has been increasing concern as to the capability of supplying food within the islands because of the degradation of marine resources and local conflict, forcing the island community to face food access problems (Yamazaki et al., 2015).

2.3.1 Sampling procedure

Household-level sampling uses both purposive and random sampling methods. First, we selected two target districts, namely Tual City and Southeast Maluku District. Each of them represents fishing communities in urban and rural areas in small-

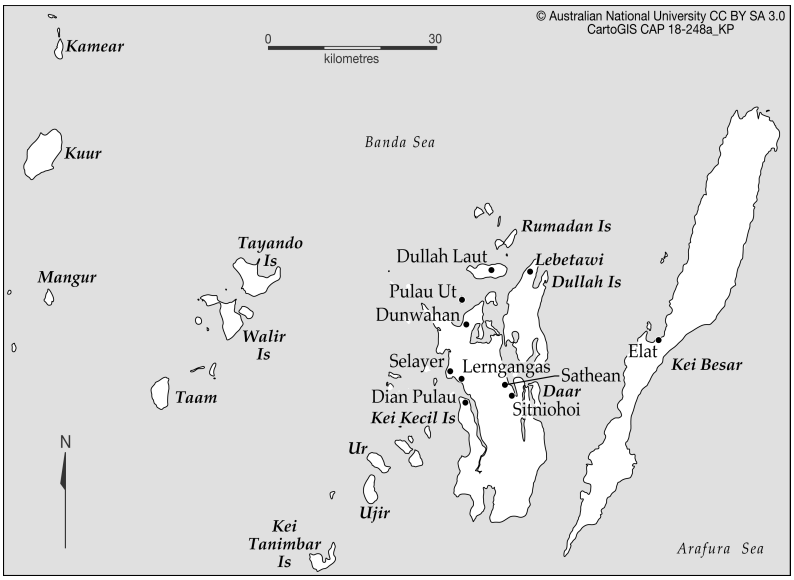


FIGURE 2.3 – LOCATION OF THE SURVEY IN NINE VILLAGES
Source: CartoGIS Services, ANU College of Asia and the Pacific, The Australian National University

island, respectively. Then, samples of fishing villages were then randomly selected in proportion to the total number of fishing villages in each district. According to Podes (Potential Village) 2014 of Statistics Indonesia, the ratio of the fishing village in Maluku Tenggara District to Tual City is about two. Hence, there were three fishing villages from Tual City, and six fishing villages from Southeast Maluku District were selected. Finally, a door-to-door households census was conducted in each village. The census aims to capture all of the fishing households in each village since administrative data to identify fishing families is difficult to find. In total, data from 534 households were collected (Table 2.1).

2.3.2 The treatment: alternative livelihood

The objective of this chapter is to use randomised evaluation to assess an expected change in household food insecurity status as a result of having access to additional income that is generated by alternative livelihood activities. However, for ethical reasons, the experiment could not include a simple randomisation procedure to form treatment and control groups in the research area, through which the control group would receive no benefits and the treatment group would receive treatment with a certain probability. Such an approach was likely to create distress among

the local community because of the current social tension.

The tension is associated with a poorly targeted subsidy from the local government that has intensified jealousy among community members regarding receiving external aid and gifts. To avoid such distress, the experiment required respondents to play an alternative livelihood game in which they have a real stake in the choice of livelihood options that yield a varying intensity of treatment among respondents (Angrist and Imbens, 1995). The treatment is framed as an additional income earned from an alternative livelihood opportunity. In the context of the fishing communities at the research site, other livelihood options included engaging in small-scale aquaculture or small-scale agriculture or becoming a motorcycle or motorboat taxi driver or a carpenter.

The implementation of the alternative livelihood game involves two steps. First, an initial wealth of either Rp5,000 ($0.4) or Rp20,000 ($1.6) is randomly offered to respondents. The initial wealth represents part of the treatment, which is randomly determined. Second, six alternative livelihood options are offered to each respondent (Table 2.2). Each livelihood option has two possible outcomes, which are determined by randomly picking up two marbles from a concealed hand. I use the exact steps as in Cameron and Shah (2015). At this step a real money is given to respondents and is framed as additional income from an alternative livelihood. The enumerator read the following phrases at this step in the survey "*Now, we want to relate your livelihood change to the questions about the food that will be eaten in your household in the next 1 week, from now, and whether you will be able to afford the food you need in this period. Imagine that the amount of funding from the livelihood change experiment will be your additional monthly income, beside your usual income.* " Further details of the procedures and the framing for implementing the treatment is provided in Part I of subsection 5 Questionnaire.[1]

Given the structure of the game, the choice of livelihood options also allows us to elicit risk preferences which is considered as an important control variable in my estimating equation and to calculate the inferred coefficient of relative risk aversion/CARRA (Table 2.2) following the procedure of Eckel and Grossman (2008).

[1]During the implementation of the investment game, we did not find any rejection to play the game, neither respondents insisted to take the initial wealth directly.

TABLE 2.2 – LIVELIHOOD OPTIONS AND INFERRED CARRA (COEFFICIENT OF RELATIVE RISK AVERSION)

Livelihood option	Low initial wealth $0.4(Rp5,000)			High initial wealth $1.6(Rp20,000)		
	Red marble	Green marble	Inferred CARRA	Red marble	Green marble	Inferred CARRA
A	Rp5,000	Rp5,000	6.32–∞	Rp20,000	Rp20,000	1.01–∞
B	Rp4,500	Rp6,500	2.07–6.32	Rp16,000	Rp25,000	0.32–1.01
C	Rp4,000	Rp8,000	1.07–2.07	Rp12,000	Rp30,000	0.23–0.32
D	Rp3,000	Rp10,000	0.74–1.07	Rp8,000	Rp35,000	0.17–0.23
E	Rp2,000	Rp12,000	0 –0.74	Rp4,000	Rp40,000	0–0.17
F	0	Rp14,000	-∞–0	0	Rp50,000	-∞–0

With two initial offers, there are 22 possible outcomes ranging from Rp5,000 to Rp70,000 ($0.4 to $5.6), which represent the treatment intensities among respondents. The average treatment intensity is equivalent to about 62% of the official unconditional cash transfer (BLT or *Bantuan Langsung Tunai*), which is Rp5,000 ($0.4) per capita per week or about 16% of the poverty line in the region.

The communication between respondent participating in the game could create the unintended effect of the treatment. To address the problem, I employ several strategies. First, the choice of survey location in the remote area provides support to limit the spill over of information between sample villages. Respondent across village can spread the information in person, but travels between villages involve significant effort. Also, communication through the telephone is possible but is very limited, considering the limited network and accessibility of (mobile) phones in the region. Second, to limit communication between subjects, we simultaneously survey all households in every village. Last, I acknowledge that these efforts might not be perfect in reducing the unintended effect of informational spill over. Therefore, I use the instrumental variable-technique to resolve the bias problem as a result of any unintended effect from spill over.

2.3.3 Measuring food insecurity

A modern definition of food security encompasses five components: availability, accessibility, effective utilisation, sustainability of the food system, and its stability (Timmer, 2015). While availability at the community level is not the focus of this study, the HFSSM module is the appropriate measure to capture the remaining dimensions. The measure is based on experiences and perceptions of respondents about their hunger experiences and those of their children.

The HFSSM module consists of 18 questions in total with 15 main questions that capture the severity of food insecurity originating from the households' financial constraints (Table 2.3). Within the HFSSM framework, a household experiences several stages of food insecurity. The process starts with the feeling of, or being anxious about, running out of food because of the household's financial constraints. The next level of food insecurity involves the perception of inadequacy regarding the quality or quantity of food eaten by the household members because there is insufficient money for food. The subsequent stage is where the household adjusts the use of foods, such as substituting usual diets with fewer and cheaper foods. The ultimate stage involves instances of reduced food intake by adults, with the physical sensation of hunger or loss of weight. The most severe instances affect children in the household. Therefore, the severity of household food insecurity ranges from the perception of running out of food to the situation of children not eating for a whole day.

In this study, the food security questions regarding the households' experience in the past 12 months were asked before the respondents played the alternative livelihood game. The responses to these questions represent a baseline for household food insecurity. After the respondents received the treatment through the alternative livelihood game, the same set of questions was asked once again but on the expected experience for one week duration given the additional income earned in the alternative livelihood game. Thus, the changes in response to the food security questions form a basis for assessing the impact of having access to an alternative livelihood on the expected household food security status.

With reference to the HFSSM module, two measures of household food insecurity are used in this study. The first measure is referred to as the raw score that

TABLE 2.3 – MAIN FOOD INSECURITY QUESTIONS IN THE HFSSM MODULE

Adult-related items		Child-related items	
Q2.	Were you worried whether your food would run out before you got money to buy more?	Q10.	Did you relied on only a few kinds of low-cost food to feed your children because you were running out of money to buy food?
Q3.	Did the food that you bought just did not last, and you did not have money to get more?	Q11.	Could you not feed your children a balanced meal because you could not afford that?
Q4.	Could you afford to eat balanced meals or not?	Q12.	Were your children not eating enough because you just couldn't afford enough food.
Q5.	Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?	Q13.	Did you ever cut the size of any of your children's meals because there wasn't enough money for food?
Q6.	Did you ever eat less than you felt you should because there wasn't enough money for food?	Q14.	Did any of the children ever skip meals because there wasn't enough money for food?
Q7.	Were you ever hungry but didn't eat because there wasn't enough money for food?	Q15.	Were the children ever hungry but you just couldn't afford more food?
Q8.	Did you lose weight because there wasn't enough money for food?	Q16.	Did any of the children ever not eat for a whole day because there wasn't enough money for food?
Q9.	Did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?		

Note: The questions are coded the same as the actual coding in the questionnaire used in the survey.

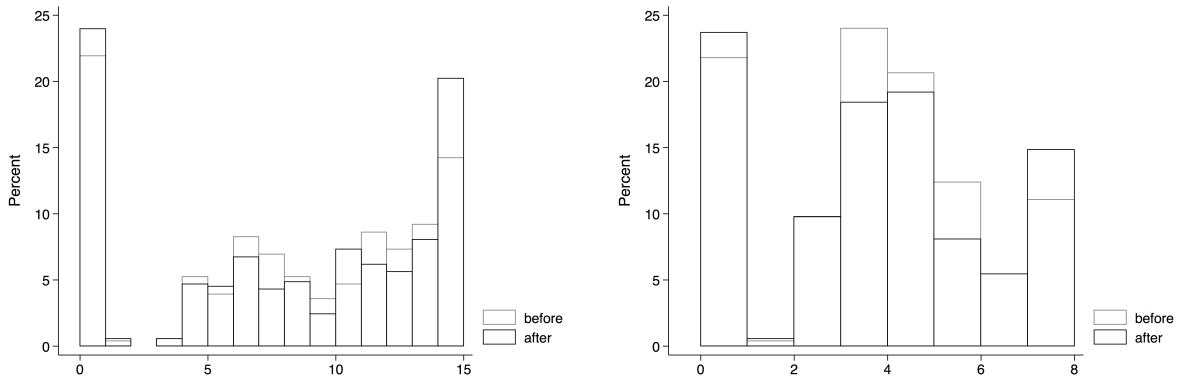
is simply derived from the number of affirmative responses to the 15 questions in Table 2.3. The scale ranges from 0 to 15 with 15 representing the worst food insecurity feeling and 0 representing feeling secure about food. The second measure is the Rasch scale of the raw score. It is a continuum scale of household food insecurity derived from the raw score, which is arguably better at capturing the food insecurity severity since it triangulates the affirmations across an individual in the sample and it assigns different importance (weight) to each question (Radimer, 2002; Webb et al., 2006).

The Rasch scale is estimated using the standard item response theory (IRT). The scale weighting is each question's importance for the population, which theoretically follows the levelling-up stages of food insecurity, from only worrying about not having a meal up to the occurrence of a child or adult skipping a meal in a day. The technique estimates a latent trait variable based on binary responses to a set of questions. The scale indicates the latent trait value as has been used in numerous studies including Agarwal et al. (2009), Gulliford et al. (2004), and Hackett et al. (2008).

Figure 2.4 shows the distribution of the raw score and the Rasch scale of the household food insecurity measure for each value pre- (baseline) and post-treatment. The raw score shows that at the baseline, 22% of respondents feel food secure and the remaining 78% respondents feel food insecure to varying degrees. The figure is slightly changed after treatment, with an increase of about 2% in those feeling food secure. There were two directions of change present in the case of those feeling food insecure. These patterns are much more similar when the Rasch scale is used.

2.3.4 Measurement error and unobserved behaviour

I acknowledge that during the survey, eliciting food insecurity in the Kei Islands population using the HFSSM module was not easy. The general problem is about the precision of the household food insecurity estimate using the 12-month period of recall. This retrospective question related to a long period might yield imperfect elicitation of the true state of the food insecurity level. Moreover, another difficulty arises owing to the complex nature of the 16 questions and the language adapt-



(a) Raw score (0–15)

(b) Rasch scale (0–7.3)

FIGURE 2.4 – RAW SCORE AND RASCH SCALE MEASURE OF HOUSEHOLD FOOD INSECURITY
Note: before = food insecurity scale before the treatment; after = food insecurity scale after the treatment

ability of the respondent towards the questionnaire. In relation to systematic error due to treatment value, at the outset of the post-treatment elicitation, I asked the respondent to be involved in determining the treatment dosage. It is likely that the measurement of post-treatment food insecurity is conflated by individual attitudes or strategic behaviour. Ultimately, such unobserved attributes could be spot-checked at the time of survey but are difficult to do so for the overall dataset. To minimise the bias originating from these measurement errors, I use the administrative randomisation of the treatment as an instrument. Later, I observe that even though descriptive statistics show indication of such measurement errors (a two-direction change in Figure 2.4), its correlation with the treatment value is trivial and its influence is minor as shown by a magnitude correction of instrumental variables (IV) estimates to ordinary least squares (OLS) estimates.

2.3.5 Estimation strategy

In the investment game, treatment intensity is expected to be correlated with individual attributes (characteristics and behaviour during the survey) that might be correlated with the outcome, that is, household food insecurity. Some of these are observed during the survey, including the risk aversion attitude of the head, and memory ability, which was obtained at the beginning of the interview. The survey adopts a simple memory test (memorising 10 words) procedure as in the Indonesian

Family Life Survey (IFLS). The OLS estimate with covariates of these observables might reduce the bias, but it might be biased by the unobserved attributes as aforementioned. Hence, an IV approach with an initial offer as an instrument for the treatment intensity is also used to tackle the potential endogeneity problem.

Hence, the naïve OLS specification of the treatment effect is as follows:

$$y_h = \alpha_h + \beta T_h + \delta H_h + \varepsilon_h \tag{2.1}$$

where y_h is the outcome variable or the household food insecurity scale, T_h is the treatment intensity, H_h is a set of household characteristics, including household head's age, household head's risk aversion, measure of social capital, head's years of education, household size, the memory test score, household's total monthly expenditure, and the household's social capital. The last two variables are used as a proxy of food access ability for the household. Household expenditure is used as the proxy of income, and the household's social capital is used as the proxy of nonmarket support originating from social networks in which a household participates, which support them to access food. The social capital is measured using a continuum scale derived from a set of questions developed by Burdine et al. (1999). The operational set of questions that are more simplified and suitable for the context of the sample is as used by Dean and Sharkey (2011). The set of questions load the factor of social integration and social involvement of a household. The Rasch technique is used to convert the affirmations to the questions into a continuum scale. A lower score represents weaker social capital. Lastly, a dummy of villages is also included to account for supply variations since it is expected to be a proxy of distance to the market.

The administrative assignment of initial wealth or intention to treat (Z_h) is used as an instrument for the treatment. If Z_h is a valid instrument, it is arguably the IV estimate producing a better estimate than the simple OLS estimate (Ravallion and Wodon, 2000). Two conditions for a valid instrument are fulfilled by Z_h. First, the initial wealth is determined at random, so that the instrument is exogenous to the treatment variable or $\text{cov}(Z, \varepsilon) = 0$. Second, the only way Z_h affects y_h is through T_h given the experimental design, that is, $v(T, Z) \neq 0$. In other words, the treatment intensity is bounded by the value of intention to treat.

Given that Z_h is a valid instrument, the following IV specification is used to

estimate the impact of the conceived livelihood change on food insecurity of the h-th household:

$$y_h = \alpha_1 h + \beta_1 T_h + \delta H_h + \varepsilon 1_h \tag{2.2}$$

$$T_h = \alpha_2 h + \beta_2 Z_h + \gamma H_h + \varepsilon 2_h \tag{2.3}$$

The IV estimation is implemented using two-stage least squares (2SLS)[2] to obtain the correct standard errors. When the instrument is valid, the estimated coefficient of the treatment variable, β_1, can be interpreted as the local average impact of the treatment on the outcome variable (y_h).

2.4 Results

Owing to the attrition of some variables, the estimates account for 487 observations. The summary statistics for key variables are presented in Table 2.4. Table 2.5 presents a balance test for some observable household characteristics for the initial values of two groups: households with the high and low initial wealth offer. It shows that there are no systematic differences between the two groups, suggesting that the initial offer is random. That is, there are no systematic differences across the IV values regarding outcome, treatment and household observable characteristics.

The sign and statistical significance of equation 2.3 show the instruments' validity. Table 2.6 presents the first-stage estimations, which show that the coefficient of the initial wealth offer has a positive sign and has statistical significance. More particularly, the treatment for respondents with the high initial wealth is about Rp18,000 (given that the coefficient is 1.2 and the difference between two initial values is Rp15,000) larger than the treatment for respondents who were offered the low initial wealth. This sizeable difference is also statistically significant at the 1% level. In the case of one endogenous regressor in the 2SLS estimate, the F-test should exceed 10 for the inference to be reliable (Stock and Yogo, 2002). The excluded-F values suggest sufficient instrument strength. That is, the statistic exceeds the critical Stock–Yogo value for 10% maximal IV size (16.38) and provides

[2]The estimation utilises Stata command of ivreg2 (2SLS) to obtain unbiased standard error.

TABLE 2.4 – SUMMARY STATISTICS

Variables	Obs	Mean	SD	Min	Max
Household food insecurity					
Raw score	487	7.651	5.168	0.000	15.000
Raw score after treatment	487	7.809	5.498	0.000	15.000
Rasch score	487	3.448	2.215	0.000	7.091
Rasch score after treatment	487	3.598	2.452	0.000	7.263
Other variables					
Memory test score	487	3.318	1.690	0.000	8.000
HH expenditure (in million Rp)	487	1.879	1.980	0.100	15.800
HH head age	487	40.973	11.571	19.000	75.000
HH head risk aversion	487	-15.307	37.625	100.000	6.326
HH social capital	487	1.118	1.064	-3.044	2.288
HH head years of education	487	8.376	3.085	0.000	17.000
HH size	487	6.517	2.664	1.000	26.000

Note: Note HH=household. Rasch score presented in this table is the rescaled value towards 0 as the lowest value by adding the original value and the minimum value.

TABLE 2.5 – HOUSEHOLD CHARACTERISTICS OF THE TWO GROUPS OF INITIAL WEALTH OFFER

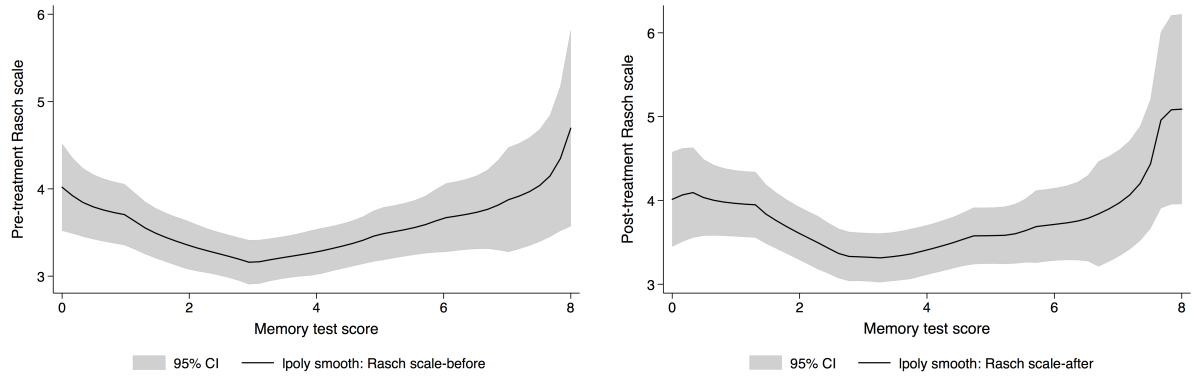
Variables	High initial offer			Low initial offer			Difference	
	Obs	Mean	SD	Obs	Mean	SD	Coeff.	p-value
Household food insecurity								
Raw score	297	7.421	5.154	190	8.011	5.182	-0.590	0.220
Raw score after treatment	297	7.505	5.438	190	8.284	5.572	-0.779	0.129
Rasch score	297	3.355	2.211	190	3.594	2.220	-0.240	0.245
Rasch score after treatment	297	3.473	2.426	190	3.794	2.484	-0.322	0.160
Other variables								
Memory test score	297	3.242	1.597	190	3.437	1.824	-0.194	0.229
HH expenditure in million Rp	297	1.943	2.060	190	1.779	1.848	0.164	0.363
HH head age	297	40.825	11.463	190	41.205	11.763	-0.380	0.725
HH head risk aversion	297	-16.382	37.687	190	-13.626	37.566	-2.756	0.431
HH social capital	297	1.125	1.090	190	1.107	1.026	0.018	0.857
HH head years of education	297	8.330	3.031	190	8.447	3.173	-0.117	0.685
HH size	297	6.593	2.914	190	6.400	2.220	0.193	0.410

Note: Note HH=household.

no evidence of weak IV.

2.4.1 Impact estimates

Table 2.7 and 2.8 show the results of OLS and IV estimates. First, to indicate the presence of measurement error for the elicited value for household food insecurity, I present the correlation between the individual memory test scores and the outcomes. It seems that the correlation is weak or not systematic suggesting that memory recall ability does not over(under)state the food insecurity level (Figure 2.5). Another source of bias is a strategic behaviour among respondents in revealing their household food insecurity questions and it might depend on the treatment intensity.



(a) Post–treatment Rasch scale—memory test

(b) Pre–treatment Rasch scale—memory test

FIGURE 2.5 – CORRELATION BETWEEN POST-TREATMENT OUTCOME—MEMORY ABILITY AND POST-TREATMENT OUTCOME—TREATMENT VALUE

If those with a high initial offer tend to lower the level of household food insecurity after the treatment (with the perception that they would not receive the money if they revealed a good food security status), then it is likely that the treatment impact is overestimated. Another case is of those with a low initial offer taking the survey less seriously and tending to reveal any good household food security status, causing the treatment impact to be underestimated. The IV estimates using initial administrative wealth as an instrument are expected to correct this issue. Comparing the results of OLS and IV estimates, the OLS results are most likely

TABLE 2.6 – THE FIRST-STAGE ESTIMATES

Dependent variable: Treatment (in 100,000Rp)

Variables	Using raw score		Using Rasch scale	
	(1)	(2)	(3)	(4)
Initial offer	1.200***	1.169***	1.199***	1.169***
	(0.061)	(0.045)	(0.061)	(0.044)
Food security before treatment	0.002*	0.001	0.004*	0.002
	(0.001)	(0.001)	(0.002)	(0.002)
Memory test score		0.002		0.002
		(0.003)		(0.003)
HH expenditure in million Rp		0.001		0.001
		(0.003)		(0.003)
HH head age		0.001		0.001
		(0.001)		(0.001)
HH head risk aversion		-0.001***		-0.001***
		(0.000)		(0.000)
HH social capital		-0.008**		-0.008**
		(0.003)		(0.003)
HH head years of education		0.001		0.001
		(0.002)		(0.002)
HH size		0.001		0.001
		(0.001)		(0.001)
Excluded-F	386.98	689.08	385.97	695.68

Note: Note HH=household. Standard errors in parentheses are two-way clustered at the village and initial value level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

biased upwards, suggesting the presence of the first case. However, the corrections made by the IV estimates are minor. Thus, based on the IV estimates, the study suggests that for every Rp100,000 increase in weekly income, the household food insecurity feeling is reduced by a factor of 2.3 (raw score) and by a factor of 1 (Rasch scale).

The treatment effect in Table 2.7 or Table 2.8 can be used to predict the amount of additional income required to reduce the experiences and perceptions of food insecurity among households in the Kei Islands (which consists of Southeast Maluku District and Tual City). The effect, however, has two strong assumption in making the prediction. First, I assume that the supply of food is enough to cover the increase of demand whenever the actual positive income shock occurs. Second, it does not incorporate how the supply of food outside the region can be improved in the future. Denoting ΔI as the average additional income needed to eliminate household food insecurity and $\hat{y}$ as the average feeling of food insecurity, the estimate of the aggregate additional income in the population is:

$$\text{Average additional income} = \Delta I = \hat{y}/\beta_1 \tag{2.4}$$

The estimate suggests that an additional household income of approximately Rp 233–283 thousand ($17.5–21.3) per week is needed, on average, (Table 2.9, row 4) for each district to eliminate household food insecurity. This amount is significantly greater than the average amount provided through the existing unconditional cash transfer programme (known as *Bantuan Langsung Tunai or BLT*), which, on average, is $1.8 (Rp 25,000) per week per household (Table 2.9, row 5), conducted by the Indonesian government (Alatas et al., 2012). Multiplying this amount by the total number of fishing households in the islands gives us an estimate of the total income change needed. These figures are presented in Table 2.9, row 6.

Indonesia has two provinces that consist of many small islands and have similar socioeconomic characteristics, namely Maluku, which Kei Islands belong to, and East Nusa Tenggara (Table 2.10) where the external validity of this study applies. According to the national census of Indonesia in 2010, there are 42,769 individuals who work in fisheries in Maluku and 53,204 in East Nusa Tenggara. I estimate the total amount of additional income required weekly to alleviate the experience

TABLE 2.7 – IMPACT ESTIMATE WITH RAW SCORE

Dependent variables: Food insecurity using raw score—after treatment

Variables	OLS		IV	
	(1)	(2)	(3)	(4)
Treatment (in 100,000Rp)	-1.855	-2.412**	-1.473	-2.260*
	(1.295)	(0.945)	(2.247)	(1.198)
Food insecurity using raw score–before treatment	0.875***	0.850***	0.874***	0.850***
	(0.021)	(0.025)	(0.021)	(0.024)
Memory test score		0.067		0.067
		(0.094)		(0.089)
HH expenditure in million Rp		-0.121*		-0.121**
		(0.066)		(0.062)
HH head age		-0.002		-0.002
		(0.014)		(0.013)
HH head risk aversion		-0.001		-0.001
		(0.004)		(0.005)
HH social capital		0.015		0.016
		(0.130)		(0.124)
HH head years of education		-0.075		-0.075
		(0.049)		(0.047)
HH size		0.035		0.035
		(0.069)		(0.065)
Village dummy		Yes		Yes
Constant	1.436***	3.169***	1.373***	3.146***
	(0.415)	(0.822)	(0.504)	(0.798)
Observations	487	487	487	487
Adjusted R2	0.674	0.681	0.674	0.659

Note: Note HH=household. Standard errors in parentheses are two-way clustered at the village and initial value level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

TABLE 2.8 – IMPACT ESTIMATE WITH RASCH SCORE

Dependent variables: Food insecurity using Rasch score —after treatment

Variables	OLS		IV	
	(1)	(2)	(3)	(4)
Treatment (in 100,000Rp)	-0.663	-0.847**	-0.588	-0.954*
	(0.542)	(0.395)	(1.025)	(0.558)
Food insecurity using Rasch scale–before treatment	0.903***	0.875***	0.903***	0.875***
	(0.018)	(0.025)	(0.018)	(0.024)
Memory test score		0.018		0.017
		(0.040)		(0.038)
HH expenditure in million Rp		-0.053*		-0.053**
		(0.028)		(0.026)
HH head age		-0.003		-0.003
		(0.006)		(0.006)
HH head risk aversion		-0.000		-0.000
		(0.002)		(0.002)
HH social capital		0.047		0.046
		(0.062)		(0.059)
HH head years of education		-0.020		-0.020
		(0.025)		(0.024)
HH size		0.008		0.008
		(0.029)		(0.027)
Village dummy		Yes		Yes
Constant	0.598***	1.341***	0.586***	1.357***
	(0.167)	(0.372)	(0.226)	(0.366)
Observations	487	487	487	487
Adjusted R2	0.664	0.670	0.664	0.645

Note HH=household. Standard errors in parentheses are two-way clustered at the village and initial value level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

TABLE 2.9 – ADDITIONAL WEEKLY INCOME REQUIRED TO ALLEVIATE HOUSEHOLD FOOD INSECURITY

Variables	Southeast Maluku District	Tual City
Expected food insecurity using Rasch scale	0	0
Current food insecurity using Rasch scale (means)	3.2	3.9
Number of fishing households	5,145	1,872
Average income change needed (thousand Rp/HH/week)	233	283
Existing official cash transfer (thousand Rp/HH/week)	25	25
Total income change needed (thousand Rp/district/week)	1,198,785	529,776

Note: HH = household.

of household food insecurity among fishing communities fully is approximately Rp 12 billion ($903,343.2) in Maluku and Rp 15 billion ($1,129,179.0) in East Nusa Tenggara.

At the time of survey, total local government revenues (province and districts altogether) are Rp 9,017 billion in Maluku and Rp 17,118 billion in East Nusa Tenggara. Of these amounts, the existing total spending for social assistance were Rp 32 in Maluku and Rp 100 in East Nusa Tenggara. The sizeable total revenue indicates that there are rooms for the fiscal space. Yet, the increase in existing social assistance spending is quite large, especially in Maluku. They are about 38% in Maluku and 15% in East Nusa Tenggara Province if the local governments adopt any food security campaign and use the magnitude impact extracted from this study.

TABLE 2.10 – EXTERNAL VALIDITY: HOUSEHOLD CHARACTERISTICS OF THE SAMPLE AND TWO RELEVANT PROVINCES IN INDONESIA

Variables	My sample	Maluku Province*	East Nusa Tenggara*
Hh expenditure (Rp/month)	1,744,568.83	2,355,059.00	1,779,690.00
HH head years of education	8	6	5
HH size	4	5	4
HH head age	41	47	47
HH total food expenditure (Rp/month)	968,217.75	1,188,458.00	750,823.60

Note: *calculated using IFLS East 2012, in real term.

2.5 Conclusion

This chapter quantifies the impact on household food security of providing access to alternative livelihoods in small and remote island communities. A laboratory experiment in the field is used to mimic a situation of having additional income through alternative livelihoods by providing a real stake in the choice of alternative livelihood options that yield a varying intensity of the treatment. Then, it was followed by a question about expected household food security status from the woman in the household. The estimates suggest that income shock does improve both adult- and child-related food security status. The estimate indicates that for every Rp100,000 (approximately 21%) of weekly permanent income increase, on average, the feeling of food security improves by 1 (0–7 scale). This is equal to having less food insecurity events by a factor of 2.3 out of 15. The actual resulting effect would depend on the supply side improvement as well as the general equilibrium effect of the increase of food demand on prices.

The estimates show that an additional household income of approximately Rp 233,000 to Rp283,000 (US$17.5 to US$21.3) per week is needed, on average, to eliminate household food insecurity in Indonesia's small islands. This amount is significantly greater than the average amount provided through the existing unconditional cash transfer programme (BLT) conducted by the Indonesian government. Roughly, the more suitable magnitude needed is eight times that of the existing programme. Further, if Indonesia wants to eliminate household food insecurity among its fishing households in Maluku and East Nusa Tenggara provinces, that is, the provinces with the smallest islands, it will need to be able to generate a total household income of as much as approximately Rp27 million weekly in this region—a very challenging task that needs a strong will on the part of the government.

Appendix

2.A Additional figures and tables

2.A.1 Sensitivity of the relationship between food security and number of islands

Figure 2.6 shows the alternative version of Figure 2.1 in which the relationship between the food insecurity and number of island at the province excludes the outliers. It shows that the underlying relationship shown in Figure 2.1 is unchanged.

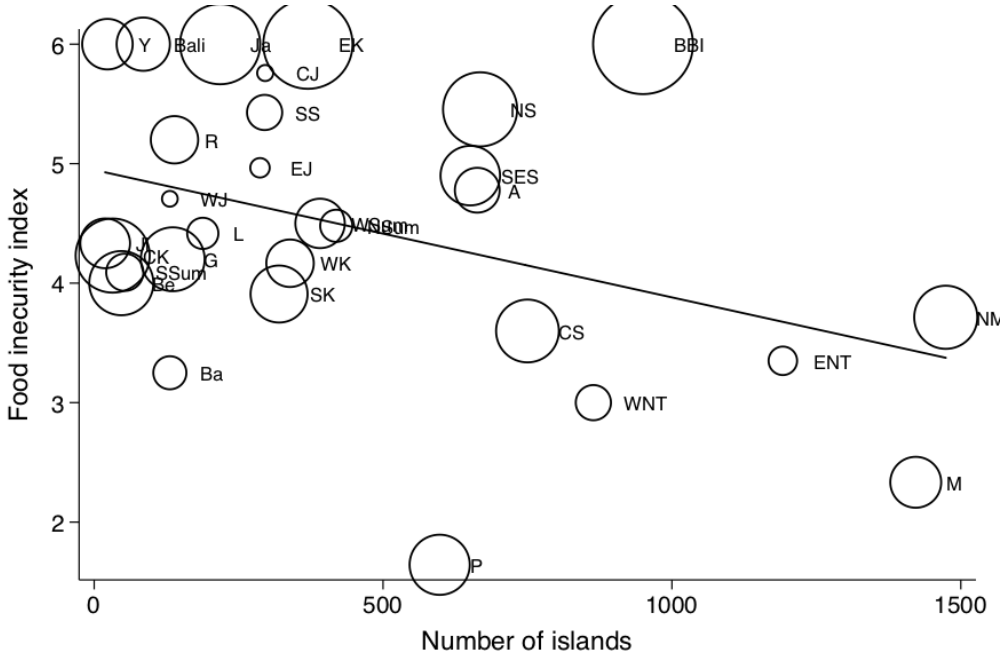


FIGURE 2.6 – ALTERNATIVE VERSION OF FIGURE 2.1

Chapter 3

Finding better livelihood: migrating to cities

Abstract

This chapter investigates the consequence of finding a better livelihood by moving from rural areas to cities. Specifically, it examines the economic assimilation of rural–urban migrants in Indonesia. It uses cross–sectional, synthetic cohort, and panel data techniques. The estimates suggest that migrants do not experience earnings penalties subsequent to their arrival in urban areas. Instead, they have persistently higher earnings relative to urban natives. However, this increase is accompanied by worsening mental health status owing to a lack of social support. The findings on the earnings premium are in contrast to that of earlier studies in countries with more restrictive policies for rural–urban migration, such as China and Vietnam. The results provide new evidence for the existing empirical findings and for inferring the superiority of the economic outcome dynamics of internal migrant in developing economies under a less–restricted internal migration system.

3.1 Introduction

People the world over have been migrating either internally (within a country) or internationally (between countries) in attempt to find different livelihoods. Common motivation to migrate could originate from relative deprivation in income or

skills (Stark and Bloom, 1985). In other words, people tend to move from their low-wage home labour market, typically in rural areas, to high-wage destination labour market, typically in urban areas. The expectation is that their earnings would eventually converge with those of non-migrants in destination areas. This process of converging earnings between migrants and non-migrants is commonly known as economic assimilation of migration.

Between two types of migration, internal migrants face fewer barriers, such as distance or language, compared with international migration. However, in addition to the natural barriers, often restrictive policies are enforced (e.g., the immigration policy for international immigrants in the US (Abramitzky et al., 2014) and the household registration of *the Hukou* in China (Frijters et al., 2011)) for rural–urban migrants and become an impediment for economic efficiency.

This chapter focuses on migrants' performance. Specifically, it investigates the labour-market integration known as "economic assimilation" of rural –urban migrants, with Indonesia as the case study. The economic assimilation of the migrant is defined as the rate of wage convergence between immigrants and natives in the hosting destinations (Chiswick, 1978; Borjas, 1985).

Natural barriers (distance or language) and restrictions (migration policies) may shape the assimilation profile and their influence depends on two factors. First is how the policy or nature of the barriers affect migrant selectivity. Second is how the policy dynamic alters migrant quality over time. For example, up to 1924, the US borders were completely open to immigrants, especially those from Europe. Abramitzky et al. (2014) observed that gradual and stricter US immigration policies since 1924 have led to a decreasing quality over time of immigrants to that country. As a result, they found that the assimilation profile of the immigrants shows a persistent wage gap between immigrants and natives rather than the standard assimilation profile which exhibits an earning penalty for migrants followed by a convergence.

Another example is as follows. China and Vietnam impose internal migration restrictions with a household registration system known as the *Hukou* system. *The Hukou* system in China prevents rural–urban migrants from accessing social services equal to those of urban native workers. The registration system also has

created notable labour–market segregation between rural–urban workers and urban workers (Frijters et al., 2011). Although *the Hukou* has been significantly relaxed since the mid–1980s (Meng and Zhang, 2001), recent empirical estimates show that the typical economic assimilation profile as the result of such a policy is an inferior outcome for migrants relative to urban natives (Ge, 2017).

Number of studies have analysed the assimilation process for international migrants (Chiswick, 1978; Borjas, 1985; Cobb-Clark et al., 2012; Breunig et al., 2013; Abramitzky et al., 2014), and few studies have examined internal migration (Zhang and Meng, 2007; Ge, 2017; Zhu, 2016). Further, analysis from different perspective of the role of institutions in the economic assimilation of the rural–urban migrant in the absence of a restriction policy is limited and it is what this chapter provides. Moreover, migration literature, so far, has documented but limited evidence on how economic assimilation of migration has consequence on mental health. Among others, these studies include Lu (2010a), Lu (2010b), and Lerner et al. (2005).

To fill the gap in the literature, this chapter examines both the economic assimilation processes and mental health condition of rural-urban migrants in Indonesia in which the environment to internally migrate is less restricted than in other places, such as China and Vietnam. The investigation allows to infer the consequences of relaxing internal migration restrictions on the economic assimilation profile of migrants. Specifically, it determines whether migrants in a less–restricted system can exploit greater benefits from migrating than migrants in a restrictive system and whether the former's relative welfare converges faster towards that of urban natives than the welfare of the latter. In other words, the Indonesian case is chosen to add variety in the empirical results of the economic assimilation of internal migrants in the developing countries.

The findings suggest that the Indonesian economic assimilation profile is quite similar to that in India (Khan, 2017) but in contrast to that of a restricted internal migration setting, such as China (Zhu, 2016; Ge, 2017) and Vietnam (Liu, 2017). Indonesia's rural–urban migrants do not experience earnings penalty upon arrival in the cities and have a persistent higher earnings level relative to urban natives over time. However, the earnings assimilation profile is in line with a worsening mental health assimilation profile, which initially exhibits no mental health gap

followed by a modest deteriorating of the mental health problem for every year since migration. Further estimates suggest that the worsening mental health is strongly correlated with decreasing social support rather than with pressure from extended working hours of migrants as predicted by the existing empirical studies.

The expected contribution of this chapter is twofold. The first is providing empirical estimates of the economic assimilation of internal migration in a liberal internal migration regime. The second is that this is the first study to link two important outcomes of the analysis of economic assimilation of internal migration, namely, earnings and mental health, and in the case of Indonesia in particular.

The chapter is organised as follows. Section 3.2 provides a literature review and summarises the estimating equation used in the literature on economic assimilation of migrants. Section 3.3 formulates the estimating equation. Section 3.4 describes the data. Section 3.5 presents results of the economic assimilation profiles, the channels, and the heterogeneity profiles analysis. Section 3.6 concludes.

3.2 Literature review

In the context of developing economies, studies examining the wage gap between rural–urban migrants and urban natives are Zhang and Meng (2007), Zhu (2016) and Ge (2017) in China, Liu (2017) in Vietnam, and Khan (2017) in India. These studies explicitly examine the economic assimilation of migrants relative to natives. However, these studies only use cross–section or synthetic–cohort data. Liu (2017), with a particular focus on occupation segregation, examines the wage gap between rural–urban migrants and urban natives in Vietnam in a static comparative perspective. As for the case of Indonesia, Manning and Alisjahbana (2010) also attempt to examine the relative performance of rural–urban migrants' earnings from a dynamic perspective but only uses a cross–section data set.

All of these studies yield diverse patterns or assimilation profiles. A primary explanatory factor is the different settings of the internal migration policy or regime. While China and Vietnam have been restricting migration through the *Hukou* system that limits the access of rural migrants to cities to service delivery, the Indian system has been relatively less restrictive. The similarity of the internal migration

regimes in the two countries seems to yield an assimilation profile for China that is not very different from that for Vietnam, although I cannot infer directly from the available static results for Vietnam.

Zhang and Meng (2007) find that the earnings of rural–urban migrants in China generally assimilate to those of their urban counterparts at the rate of 3.2% for each additional year spent in the host city. A recent study by Ge (2017) finds that rural–urban migrants in China start with a wage penalty of 32% relative to natives, with a rate of convergence of 1.5% for each additional year spent in the city and a decreasing rate of 0.25% of years-squared. The combined effect yields the result that migrants' wages cannot catch up with those of urban workers in the long run. Liu (2017) estimates that the earnings of rural–urban migrants in Vietnam, in aggregate, is lower by 31.4% than that of natives, using a standard Mincerian equation. Since the estimates are based on a static setting, her results cannot be used to infer how these earnings evolve by time spent in the city. Conversely, the attempt by Manning and Alisjahbana (2010) to infer the assimilation profile of internal migrants who can freely move from rural to urban areas yields a different result. They indicate that Indonesian rural–urban migrants in four cities tend to experience a standard assimilation profile with the recent migrant experiencing wage penalty and the lifetime migrants' earnings overtaking the urban native's earnings.

Furthermore, a comprehensive review of studies on migration effect on mental health provided by Butler et al. (2015) highlights inconsistencies among the existing research findings. The review at the end argues that more empirical work observing the mental health consequences of migration is highly needed. Among others are for the following reasons. Migrant's vulnerability toward psychological disorders arises from the fact that migration is a complex process and entails family disruption and disconnection from current social ties (Lu, 2012). The existence of labour market pressure for long working hours (Frijters et al., 2010), as well as biological and cultural factors in hosting locations Butler et al. (2015), have been widely known to influence mental health of migrants over time. This present study hence aims to examine both economic assimilation and mental health consequences of migration to add the empirical findings. The study of this chapter

differs from Lu (2010a) and Lu (2010b) since I use non-migrant in the destination as the comparison group instead of non-migrant in the sending location. Hence, I focus on assimilation rather than impact of migration.

3.3 Empirical strategy

Empirical studies on the economic assimilation of migrants commenced with the international migration context using a cross–section data in the 1970s. One of the earlier assimilation models was developed by Barry R. Chiswick in 1978 which focused on dismantling the dynamic quality of successive migrant cohorts and individual heterogeneity from the coefficient of interest on Years Since Migration (YSM). The core of the model by Chiswick (1978) with cross-section data is:

$$\log W_i = \mathbf{X}_i\beta_0 + \beta_1 I_i + \beta_2 YSM_i + \beta_3 AGE_i + \beta_4 AGE_i^2 + \varepsilon_i \tag{3.1}$$

where i indexes individuals.

The estimating equation prescribes a linear regression of the natural logarithm of annual earnings $\log W_i$ on a set of exogenous variables: I_i, a dummy variable that equals unity if the person is foreign-born and zero if a native; YSM_i, the number of years the immigrant has resided in the host country, which equals zero for native; and X_i, a vector of socioeconomic characteristics (mainly age and years of schooling, geographical dummies and weekly hours worked) and AGE, the calendar age to proxy gross-labour market experience.

Equation 3.1 estimates the earnings assimilation profile of immigrants relative to natives using two parameters: β_1, whether there is a wage penalty/premium upon arrival and β_2, yearly change of the relative earnings as immigrants assimilate in the city. Since the total experience effect (labour market) measured by age and gross education effect measured by years of schooling have been controlled for, the assimilation coefficients are often attributed to specific training/skills acquired or the extent to which the immigrant obtains the hosting city's human capital transferability (Borjas, 1985).

Two important critiques emerge in responding to the core model with cross-section data: (i) the core model's lack of attribution for a dynamic change of cohort

quality, which empirically is a strong confounder for the assimilation coefficient and (ii) the strong potential bias owing to the nonrandom process of remigration (Borjas, 1985). The solution for the first concern is to include a cohort effect in equation 3.1, which requires the use of repeated cross-section data to avoid further identification problems, known as a synthetic-cohort approach. As for the second concern, nothing more can be done in a situation in which complete remigration data are lacking. The use of the synthetic-cohort model as prescribed by Borjas (1985) has now become the norm.

In his synthetic-cohort model, Borjas (1985) utilizes a repeated cross-section data obtained in a calendar census $Year = \{1, ..., t\}$ and injects migrant time arrival ($COHORT_i$) or "cohort effect" into the equation and separates the equation into two because of the identification problem.

Migrant equation:

$$logw_{it} = \mathbf{X_{it}} \cdot \beta_\mathbf{0} + \beta_1 \cdot YSM_{it} + \beta_2 \cdot AGE_{it} + \beta_3 \cdot AGE_{it}^2 + \mathbf{COHORT_i} + \mathbf{YEAR_t} + \varepsilon 1_{it} \quad (3.2)$$

Native equation:

$$logw_{it} = \mathbf{X_{it}} \cdot \beta_\mathbf{0} + \beta_1 \cdot AGE_{it} + \beta_2 \cdot AGE_{it}^2 + \mathbf{YEAR_t} + \varepsilon 2_{it} \quad (3.3)$$

where t indexes census year, $COHORT$ is a vector of arrival cohort fixed effect and $YEAR$ is a vector of census year fixed effect. Subsequent empirical studies on economic assimilation of migrants follow this approach, and they include Lindstrom and Massey (1994) for Mexican in the US, Longva and Raaum (2003) for immigrants in Norway, and Lemos (2013) for immigrants in the UK.

While the synthetic-cohort model refines the estimates from an unobserved secular change of migrant quality at the cohort level, it does not address the unobserved heterogeneity of migrants over time at the individual level. The synthetic-cohort model also assumes that the composition of migrants by cohort is constant over time, which is a heroic assumption in the presence of re-emigration.

Cobb-Clark et al. (2012) and Abramitzky et al. (2014), hence, suggest to include individual effects in the estimating equation. Certainly, such an approach needs panel data at the individual level that tracks the same individual migrant over time. This type of data is often unavailable or expensive to obtain. The specifications use YSM in an integer (Cobb-Clark et al., 2012) or a categorical group

(Abramitzky et al., 2014). The categorical approach allows the use of the variable that identifies the penalty/premium upon arrival (I) in a pooled migrant and native sample with a panel data fixed-effect estimator. The Abramitzky et al's model is as follows:

$$Occupation_score_{it} = \boldsymbol{\alpha}_i + \boldsymbol{\mu}_i + \boldsymbol{\theta}_t + \boldsymbol{\gamma}_{it} + \beta_1 \cdot AGE_{it} + \beta_2 \cdot AGE_{it}^2 + \beta_3 \cdot AGE_{it}^3 + \beta_4 \cdot AGE_{it}^4 + \varepsilon_{it} \tag{3.4}$$

where occupation score is a proxy for labour-market earnings that varies between (but not within) occupations. $\boldsymbol{\alpha}$ denotes the country place of origin fixed effect, $\boldsymbol{\mu}$ is the year of arrival in the hosting country fixed effect and, $\boldsymbol{\theta}$ is the census (survey wave) year fixed effect. $\boldsymbol{\gamma}$ is a vector of variables γ which separates the foreign-born individuals into five categories according to time spent in the hosting country place (0–5 years, 6–10 years, 11–20 years, 21–30 years, and 30 or more years), with the native-born individuals constituting the omitted category.

The sign and magnitude of the coefficient on the first dummy variable (0–5 years) indicate whether immigrants received an occupation-based earnings penalty (or premium) upon the first arrival to the hosting country, whereas the remaining dummy variables reveal whether immigrants eventually catch up with or surpass the occupation-based earnings of natives. As for the cohort effect concern, their specification divides the foreign-born into two year-of-arrival cohorts indicated by μ_m (arrivals before and after 1890) as for the context of the US immigration policy dynamic.

In this chapter, which I analyse the assimilation process of rural-urban migrants in Indonesia, I extend the specification at the equation (1) by applying the framework of Abramitzky et al. (2014), so that the unobserved time-invariant heterogeneity of individual migrants is controlled. Specifically, I implement fixed-effect (FE) approach. It is used as the preferred estimating equation for this reason. For the purpose of a robustness check, I also adopt Hausman and Taylor (1981), referred to as HT. The HT estimator formulates an IV estimator for panel data that controls for possible correlation between included variables and unobserved individual effects (Breunig et al., 2013). For HT specification, I use variables as similar as in Pooled OLS and FE model (see Appendix, Equation 3.6). The general model

used in this chapter is as follows.

$$outcome_{it} = \boldsymbol{X}_{it} \cdot \beta_1 + \mathbf{GROUP_{it}} \cdot \beta_{\mathbf{2}} + \beta_3 \cdot AGE_{it} + \beta_4 \cdot AGE_{it}^2 + \mathbf{COHORT_i} + \boldsymbol{\mu}_i + \boldsymbol{\theta}_t + \varepsilon_{it} \tag{3.5}$$

Our main outcome variables are earning and mental health status. Similar to γ in the Abramitzky et al. (2014) model, **GROUP** is a vector of dummies separating rural–urban migrants into five categories according to time spent in the cities (0–5 years, 6–15 years, 16–25 years, 26–35 years, and 36 or more years), with the non-migrant as the omitted category. **COHORT** is the year of arrival dummies. X is a set of individual level covariates and it includes gender, marital status, education and occupational category. I also include hosting city dummies and sending region (province) dummies in the specification ($\boldsymbol{\mu}_i$). Our coefficients of interest are β_2.

The sign and magnitude of the coefficient on the first dummy (0–5 years) indicate whether a migrant received earnings penalty (or premium) upon arrival for the earnings regression. The specification also includes the time of survey (waves) dummies, $\boldsymbol{\theta}$, except for an estimate with fixed-effect. This coefficient is interpreted slightly differently for mental health outcomes and are attributed to the relative mental health status upon arrival.

The remaining dummy variables reveal whether the migrants' earnings and mental health status eventually assimilate with that of nonmigrants in the host city over time. For robustness purpose, I also implement the alternative specification with only a dummy of (0–5) years as the indicator for earning penalty/premium and YSM as the indicator for the speed of convergence. This specification is used by Cobb-Clark et al. (2012).

The point estimate of β_2 leads to two possibilities of hypothesised economic assimilation profiles. Type 1 of the hypothesised assimilation profile is, in the case of economic assimilation, an earnings penalty followed by a convergence when β_2 for the first dummy (0–5) years is negative and β_2 for all the rest of the dummies are positive. The common interpretation for this profile is that migrants started with a lower skill level relative to urban non-migrants and, gradually, they catch-up with the urban's labour market skill-level. In other words, the skill transferability has occurred. Type 2 of the hypothesised assimilation profile is a persistent earnings gap relative to non-migrants, either lower when all $\beta_2 < 0$ or higher when all $\beta_2 > 0$.

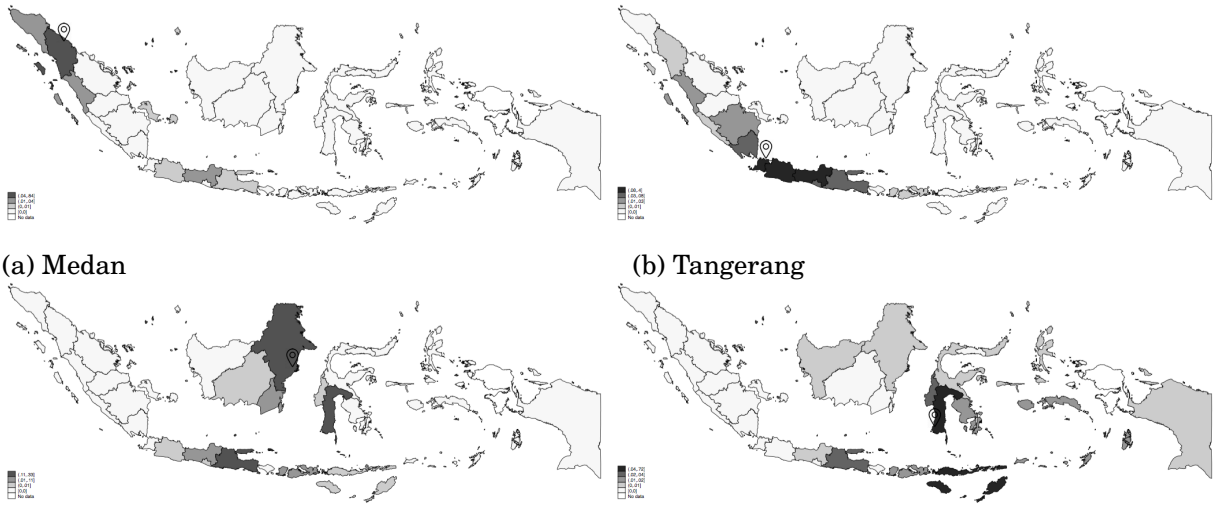
In the case when $\beta_2 < 0$, migrants started with a lower skill level than urban non-migrants and the skill transferability has not occurred. In contrary, when $\beta_2 > 0$, migrants started with a higher skill level implying that they are highly and positively selected out from the rural area.

3.4 Data

The dataset utilised in this chapter comes from a longitudinal survey observing rural-urban migrants, Rural Urban Migration in Indonesia (RUMiI) surveys in four major Indonesian cities: Medan, Tangerang, Samarinda, and Makassar (Figure 3.1). These cities are the main migrant destination cities in each major island groups in the country: Sumatera, Java and Bali, Kalimantan and Eastern Indonesia. The survey waves are four consecutive years from 2008 to 2011. It tracked both rural–urban migrants and urban native households with an initial number of 1,521 migrant households and 850 native households, that is, a total of 2,371 households, in 2008. The sampling details is documented in Resosudarmo et al. (2010) and is summarised in the supplementary section on page 172.

In this survey, rural–urban migrants are defined as individuals who stay continuously in the rural area for at least five years until they turn 12 years old and at the time of the survey reside in an urban area. Further, recent migrants are those who moved to a city in the five years preceding the survey and lifetime migrants are those who moved to a city more than five years before the time of survey. The information about the time of migration is subjective and retrospective in nature which was elicited from respondents. In this case, there could be a potential measurement errors-bias when it is correlated with age. Hence, I acknowledge that the bias originated from this measurement error might still present without an external instrument as the exogenous variable despite that I already controlled for the individual fixed-effects.

The focus of analysis in this chapter is earnings and mental health. Earnings are defined as the total earnings of three types of occupational categories (employees, public employees, and self-employed individuals) in the month preceding the survey. These earnings include fringe benefits (food, transport, housing, and the



(a) Medan (b) Tangerang

(c) Samarinda (d) Makassar

FIGURE 3.1 – CONCENTRATION OF SENDING REGIONS BY HOST CITY
Note: The darkest of the colour represents higher concentration of migrants. Source: RUMiI, 2008.

value of in-kind payments). Mental health is measured using the 12-item General Health Questionnaire (GHQ), and the surveys follow the standard approach of summing the 12 GHQ responses to form an index running from 0 to 36 (Likert scale) with 0 and 36 representing the highest and lowest levels of mental health, respectively (Fritjers et al., 2009; Meng and Xue, 2017). A higher score corresponds to more depressive symptoms affirmed.

To better understand mental health issues this chapter also pays attention on social support and hours worked. Social support is defined as number of people in the social network and helping, such as borrowing money, searching for a job, taking care of children, or friends for sharing and asking for advice. The number of people is weighted by their education level and relationship (family, extended family, and friend). Hours worked is measured from a question on number of hours (average) per week the respondent worked in the main job the previous year. Table 3.1 summarises the key variables of the sample in the baseline survey in 2008.

TABLE 3.1 – SUMMARY STATISTICS

Variables	Recent*		Lifetime**		Native		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	28.55	8.78	43.96	10.9	43.57	10.74	41.04	11.99
Years of schooling	10.25	3.14	10.34	3.78	9.94	3.93	10.16	3.74
Married	0.51	0.5	0.89	0.31	0.9	0.31	0.83	0.38
Share of male	0.78	0.41	0.92	0.27	0.92	0.27	0.9	0.3
Earnings (million Rp.)	1.36	1.08	2.45	12.91	1.98	5.92	2.06	9.1
Hours worked	52.33	33.24	52.67	39.92	49.76	26.44	51.4	33.72
Mental health score	11.73	3.96	11.13	4.27	11.34	4.44	11.32	4.3
Social support score	17.16	11.33	14.66	10.86	13.56	10.65	14.65	10.93
Share of employee	0.74	0.44	0.56	0.5	0.57	0.5	0.6	0.49
Share of public employee	0.02	0.14	0.09	0.29	0.07	0.26	0.07	0.26
Share of self-employed	0.24	0.43	0.34	0.47	0.36	0.48	0.33	0.47

Note: *(1–5 years), **(>5 years)

Source: RUMiI, 2008.

3.5 Results

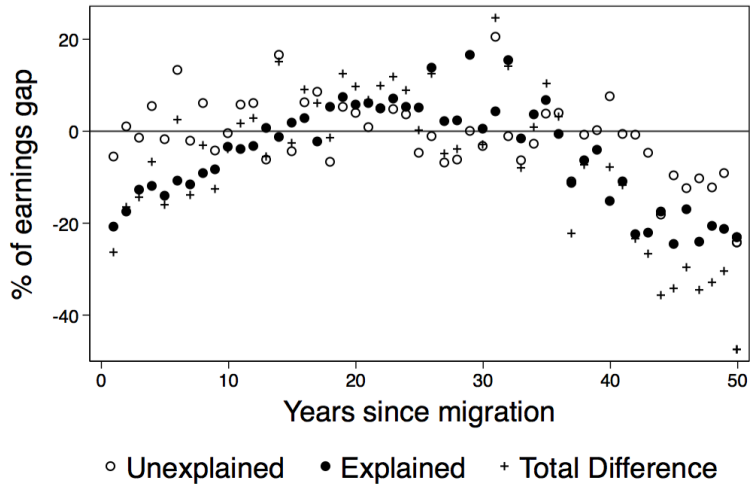
3.5.1 The cohort effect

One of the empirical tasks in this chapter is to disentangle the cohort effect, individual heterogeneity and cities' human capital transferability in explaining the internal migrants' economic assimilation. Concerning the cohort effect and individual heterogeneity, first, the estimates examine whether the cohort effect plays a role in bias formation for the assimilation estimates. To do so, it quantifies the extent to which the unobserved factors explain the wage gap between natives and migrants relative to observable factors by each cohort group. A standard Blinder–Oaxaca decomposition/B–O decomposition (Blinder, 1973; Oaxaca, 1973) is used, and the decomposition assumes that there is discrimination by wage between the two groups based on migration status. The discrimination is attributed to both the skill gap and a latent trait that can explain the gap, such as ability or motivation.

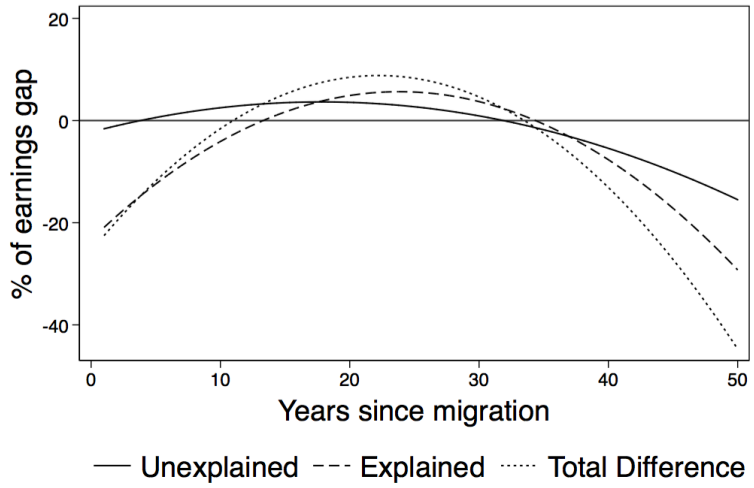
The B–O decomposition implements the twofold decomposition into the RUMiI dataset, and it comprises endowment and unknown parts with the pooled coefficients as the benchmark for the two groups. Although the use of another technique, such as the Nopo decomposition (Pakrashi and Frijters, 2017), is plausible, all distributions of key variables support the use of the standard B–O decomposition. Distribution of key variables of migrants and urban natives is identical (see Appendix, Figure 3.6).

The included covariates are age, education (proxied by years of schooling), gender, occupational type (employee, self-employed, public employee, and unpaid domestic labour), and city dummies. Figure 3.2 shows the decomposition results. It tells us that the individual heterogeneity presents in explaining the gap (net of the city factors) apart from the observables. The shares of the unexplained part vary across the cohort, which indicates that the cohort effect should be controlled for in the main estimate. For the recent migrants, the earnings gap is explained more by the endowment effect than the unobserved effect. The opposite case applies for the oldest year since it belongs to the migration group of lifetime migrants.

I use three definition of COHORT for estimating equation 3.5. First is to di-



(a) Scatter plot



(b) Quadratic fit

FIGURE 3.2 – B–O DECOMPOSITION

Note: Each dot represents the mean differences of log earnings between each group m in YSM with urban natives in twofold decomposition: a part that is explained by differences in determinants of earnings (AGE, $GENDER$, $EDUCATION$, $MARITAL$, $OCCUPATION$, and $CITY$), and another part that cannot be explained by such group differences.

TABLE 3.2 – COHORT EFFECTS

Dependent variable: natural log of monthly earnings

GROUP	Without COHORT	Finest	Crisis dummy	3-period
1–5 years	0.046	0.671***	0.262**	0.261**
	(0.082)	(0.035)	(0.047)	(0.049)
6–15 years	0.060	0.857***	0.281*	0.287**
	(0.066)	(0.049)	(0.093)	(0.086)
16–25 years	0.073	1.237***	0.296	0.310**
	(0.047)	(0.204)	(0.106)	(0.097)
26–35 years	-0.020	1.480***	0.204	0.216
	(0.045)	(0.214)	(0.117)	(0.103)
$>$ 36 years	0.125*	2.017***	0.349*	0.494**
	(0.069)	(0.236)	(0.106)	(0.099)
Observations	2340	2340	2340	2340

Note: All columns are Pooled OLS estimates. YSM = years since migrating. Standard errors are in parentheses and clustered at each cohort definition level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

vide waves of migrant into pre–and post–1998 Asian financial crisis which systematically differ due to labor market structural change (Manning and Alisjahbana, 2010). Second is to divide the waves into three period of presidency which can lead to different rural-urban migrant types (Effendi et al., 2010). Last is to divide the waves by each calendar year or arrival. I prefer the last division as it is the most conservative definition. Table 3.2 presents the estimate without and with cohort dummies and confirms the need of controlling cohort effect as the B-O decomposition result suggests.

3.5.2 Main estimates

Key results for the estimates are presented in Table 3.3. To facilitate interpretation, Figure 3.3 describes the assimilation profile for each outcome by specification (specification with and without cohort effect and remigration effect; and panel data fixed effect). In general, the results show type 2 of the hypothesised profile: a persistent gap of earnings (higher) and mental health (lower) for migrants relative to urban natives.

My preferred estimates are the fixed effects (FE) because it eliminates the time-invariant and relevant unobserved factors, such as motivation at the time of migration. Based on the fixed-effect estimates, the rural–urban migrants in Indonesia's four big cities do not experience a wage penalty upon arrival (see in Table 3.3-column 1-4 or Figure 3.3-Panel A). Instead, their income overtook average income of urban natives by about 46% since the early time of arrival in the cities. This superior relative earning remains for the rest of the year since migration and almost triples after 36 years of time spent in the city. The large portions of our sample by occupation is self-employed individuals both for migrants and non-migrants. Therefore, the earning gaps captured in the analysis is a representation of entrepreneurship activity. The profile is robust to the alternative specification and attrition bias as reported in Appendix (see Appendix, Tables 3.7 and 3.8).

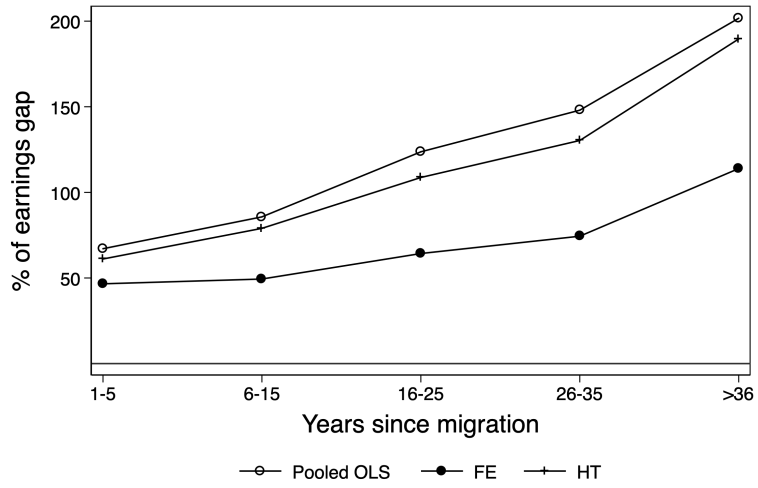
However, along with the earning superiority, the migrants suffer mental health problems (see Table 3.3-column 5-8 or Figure 3.3-Panel B). The estimates based on the fixed-effect model, which each of them controls for time-invariant individual heterogeneity, show that the migrants are consistently having worse mental health scores ranging from about 3 to 6 (out of 36) above the average score of the urban native.[1]

I should note, however, the sample data does not cover each cohort of birth evenly. It is likely that the distribution oversampled younger cohorts that makes the assimilation estimate might be overstated. As the consequence, the estimates serve as the upper bound of the magnitude impact of time on earnings gap.

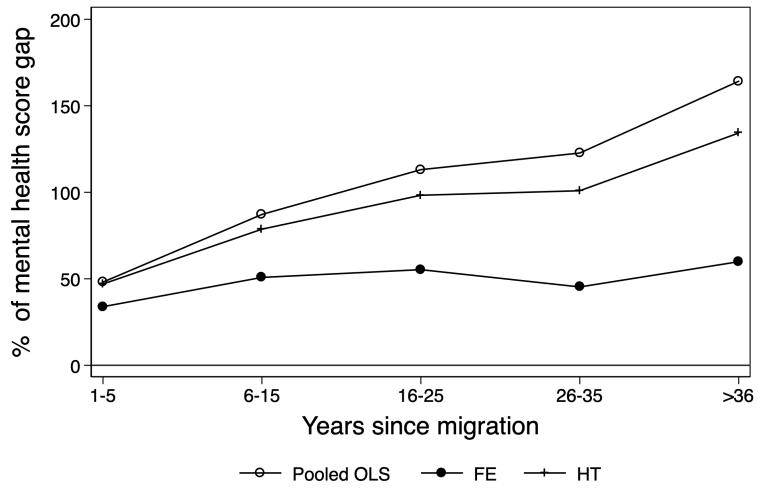
3.5.3 Channels

Further estimates test two possible channels that have been used in the literature for investigating why rural–urban migrants suffer greater deterioration in mental health status than non-migrants. I test two possible channels: extended working

[1]Up to this point, it is important in an economic efficiency point of view that we should compare the earning premium with the actual cost of solving the mental health problem. This type of analysis, unfortunately, despite its importance is beyond the scope of my study. I leave the detailed analysis calculating a net benefit from migrating by comparing earning premium and mental health costs for future study.



(a) Earnings



(b) Mental health

FIGURE 3.3 – ECONOMIC ASSIMILATION PROFILE

Note: Each dot represents $100 \cdot \beta$ of coefficients in Table 3.3. It measures the percentage gap of earnings and mental health score for each arrival group of m relative to urban native.

TABLE 3.3 – MAIN OUTCOME ESTIMATES

	log(monthly earnings)				log(mental health score)			
GROUP	Pooled OLS		FE	HT	Pooled OLS		FE	HT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1–5 years	0.643***	0.671***	0.466***	0.611***	0.430***	0.481***	0.339***	0.470***
	(0.032)	(0.035)	(0.103)	(0.068)	(0.019)	(0.014)	(0.037)	(0.030)
6–15 years	0.850***	0.857***	0.494***	0.790***	0.770***	0.872***	0.508***	0.787***
	(0.060)	(0.049)	(0.160)	(0.101)	(0.037)	(0.027)	(0.058)	(0.055)
16–25 years	1.253***	1.237***	0.643**	1.087***	1.005***	1.131***	0.553***	0.983***
	(0.182)	(0.204)	(0.265)	(0.218)	(0.101)	(0.121)	(0.140)	(0.135)
26–35 years	1.329***	1.480***	0.744**	1.303***	1.128***	1.227***	0.453*	1.009***
	(0.206)	(0.214)	(0.280)	(0.217)	(0.123)	(0.175)	(0.240)	(0.201)
$\geq$ 36 years	1.875***	2.017***	1.139***	1.896***	1.498***	1.642***	0.599*	1.343***
	(0.235)	(0.236)	(0.308)	(0.231)	(0.203)	(0.240)	(0.317)	(0.276)
COHORT	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Balanced panel	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Observations	2991	2340	2340	2340	3091	2410	2410	2410

Note: YSM = years since migrating. All specifications except FE include AGE, EDUCATION, GENDER, MARITAL, OCCUPATION, CITY, SENDING PROVINCE, and arrival COHORT. FE estimate uses time variant controls of AGE and MARITAL. COHORT uses the finest definition. Standard errors are in parentheses and clustered at year-of-arrival level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively. Full estimates are available in Appendix, Table 3.9.

hours (Fritjers et al., 2009) and a decline in social support (Lu, 2010a). I present the mental health-estimates with and without the channels as covariates in Table 3.4. They suggest that working hours and social support are reasonable channels on statistical point of view. First, each channel variable has statistical significance which indicates that the channel pickups the main variables' effect on the outcome. Second, some of the magnitude of the main coefficients is getting smaller after we introduce each covariate. Given the validity to use these two variables as the channels, I then estimate assimilation profile for working hours and social support as similar as I did for the earning variable.

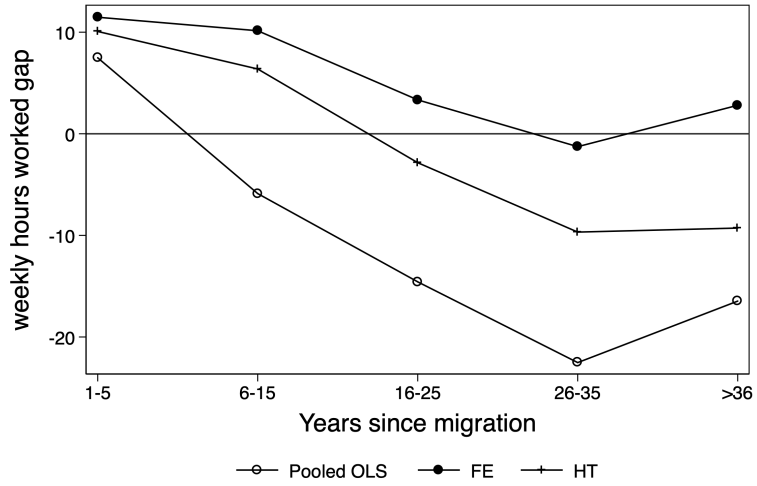
As for the first channel of extended hours of work, in the context of negative selection of migrants from rural areas, it has been argued that internal migrants often spend more hours in the labour force to compensate for their lower productivity and to maintain a level of earnings comparable with that of non-migrants (Frijters et al., 2010). The situation in Indonesia is rather different. We have seen that migrants have persistently higher incomes following arrival. If working hours

TABLE 3.4 – CHANNELS ESTIMATE FOR MENTAL HEALTH

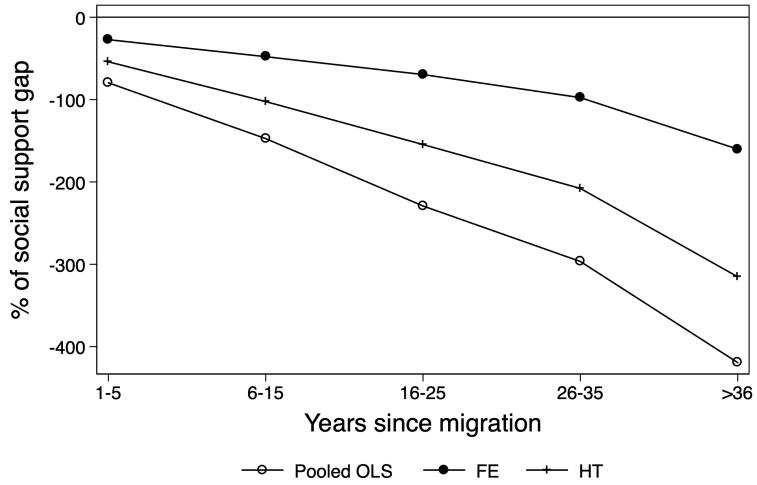
Variables	No channel	With working hours	With social support
1-5 years	0.341***	0.362***	0.317***
	(0.037)	(0.032)	(0.029)
6-15 years	0.511***	0.513***	0.454***
	(0.059)	(0.056)	(0.060)
16-25 years	0.557***	0.547***	0.526***
	(0.141)	(0.134)	(0.140)
26-35 years	0.462**	0.442**	0.421*
	(0.220)	(0.213)	(0.224)
>36 years	0.611**	0.614**	0.545*
	(0.301)	(0.295)	(0.314)
Working hours		-0.002**	
		(0.001)	
Social support			-0.041**
			(0.019)
Observations	2481	2476	2333

is the channel for superior earnings and deteriorating mental health, we would expect persistently higher working hours for migrants than for non-migrants. In contrast, the estimates based on FE specification show that rural–urban migrants indeed work longer hours (about 8 per week) upon arrival, but the hours converge towards those of non-migrants about 16 years after migration (see Table 3.5 columns 1–4 or Figure 3.4 Panel (a)).

Since a factor related to labor market seems not explaining the mental health assimilation profile, I test another non-labor market factor, a lack of social support. Lu (2010b) tested it using Indonesia Family Life Survey (IFLS) data for the case of Indonesia and showed that the mental health problem is associated with reduced social support. The specifications replicate the earning assimilation estimating equation for this outcome of interest and add relevant covariates. For the estimating equation of social support, to limit the influence of between variation of the hours worked, I use hours worked as the covariate. Figure 3.4—Panel B shows that social support declines for migrants relative to natives over time spent in cities (see Table 3.5 column 5-8 as well). This profile is in line with the mental health and earning assimilation profile. Further, the social support estimate indicates that it might be the case of internal migrant in Indonesia, a lack of social support drives mental health problem and not the extended working hours.



(a) Hours worked



(b) Social support

FIGURE 3.4 – POSSIBLE CHANNELS FOR MENTAL HEALTH PROBLEM

Note: Each dot in panel (a) represents β and each dot in panel (b) represents $100 \cdot \beta$ of the coefficients Table 3.5. It measures the hours gap and percentage gap of social support score for each arrival group of $COHORT$ relative to the urban native, respectively. *Not all coefficients plotted in panel (a) are statistically significant.*

TABLE 3.5 – MENTAL HEALTH CHANNEL –ESTIMATES

	Working hours				log(social support)			
GROUP	Pooled OLS		FE	HT	Pooled OLS		FE	HT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1–5 years	-4.974***	7.478***	11.471***	10.072***	-0.691***	-0.796***	-0.272***	-0.541***
	(1.071)	(0.807)	(1.651)	(1.545)	(0.028)	(0.023)	(0.062)	(0.049)
6–15 years	-13.994***	-5.886	10.142***	6.378*	-1.449***	-1.474***	-0.479***	-1.024***
	(2.165)	(4.600)	(3.344)	(3.533)	(0.116)	(0.158)	(0.161)	(0.168)
16–25 years	-40.570***	-14.573**	3.339	-2.848	-2.224***	-2.292***	-0.696***	-1.546***
	(13.057)	(6.168)	(6.030)	(6.043)	(0.125)	(0.181)	(0.186)	(0.188)
26–35 years	-49.527***	-22.523***	-1.269	-9.676	-2.987***	-2.966***	-0.976***	-2.079***
	(13.398)	(6.992)	(7.616)	(7.013)	(0.189)	(0.189)	(0.288)	(0.213)
$\geq$36 years	-52.310***	-16.470**	2.807	-9.278	-4.182***	-4.194***	-1.602***	-3.152***
	(13.667)	(6.959)	(8.395)	(7.442)	(0.198)	(0.200)	(0.299)	(0.214)
Observations	2986	2336	2336	2336	2889	2264	2264	2264
COHORT	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Balanced panel	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Note: YSM = years since migrating. All specifications except FE include EARNINGS, AGE, EDUCATION, GENDER, MARITAL, OCCUPATION, CITY, SENDING PROVINCE, and arrival COHORT. FE estimate uses time variant controls of EARNINGS, AGE and MARITAL. COHORT uses the finest definition. Standard errors are in parentheses and clustered at year-of-arrival level with ***, **, and * indicating 1, 5, and 10 % significant levels, respectively. Full estimates are available in Appendix, Table 3.10.

3.5.4 Interpretation of the economic assimilation profile

Figure 3.5 presents the fixed-effect estimates and the simple average difference of the earnings gap between migrants and urban natives; i.e. without controlling heterogeneity between cohorts. The simple average difference (solid line) shows the simple earnings difference at the level for each cohort group relative to urban natives. Inferring with this line, it seems that migrants experience a standard assimilation process as predicted by the general Immigrant Assimilation Hypothesis (IAH) with an inverted U shape. In other words, they seem to experience earnings penalty upon arrival followed by a convergence toward that of urban natives with diminishing return. The literature on immigrant assimilation, such as (Borjas, 1985), however argued that these figures are not economic assimilation measures since they do not control for heterogeneity between cohort groups as well as between individuals.

This pattern, in Figure 3.5, is driven by a condition that migrants are highly motivated and better in terms of quality, which implies that the estimate is under-

stated with the simple average difference estimate when we compare them with native separately in each cohort. In addition, the pattern is also influenced by dynamic change of cohort's quality. The true measure of the assimilation or the human capital transferability by time spent in the city is provided by the estimates which each of them conditionals on other migrant's performance with different time spent in the city, i.e. Equation 5 or results in Table 3.3.

It reveals that the actual speed of "convergence" of the migrants' earning relative to that of urban natives after the cohort effect and individual heterogeneity effect are ruled out differs. Ultimately, the fixed-effect estimate measures an earnings' premium upon arrival at the rate of nearly 50% followed by a moderate increase subsequent to years since migrating up to more than 100% in 36 years.

In addition, the widening gap between coefficients of the specification with and without cohort effect (Figure 3.3) also tells us about the tendency of a declining quality of migrant cohorts over time[2]. The interpretation is that the positive selection out of village has occurred strongly in the early periods of internal migration when the hurdle to migrate associated with the cost of moving from rural–to–urban areas is relatively still high. This secular positive selection trend across cohorts mainly explains the persistence gap of earning of migrants relative to that of urban natives. The comparison of the coefficients between those of the full observation and balanced panel shows that the remigration effect is relatively low. Unlike in the international migration context, it seems that the internal migration—remigration dynamic possesses a relatively more random processes across cohorts owing to non–systematic changes to the migration policy in various period.

3.5.5 Heterogeneity by demography and geography

I extend the analysis with subsampling the estimates for main outcomes by demography and geography variables that matters for migrant quality selection[3]. The

[2]One of direct ways to look at the pattern is by observing the average years of schooling by time of arrival. I provide the graph in the Appendix section (Figure 3.7). It shows an inverted-U pattern of years of schooling across time of arrival which suggests a moderate decline in the recent years. The graph, however, serves as an indicative tool to see changes of quality proxied by years of schooling.

[3]The approach of heterogenous analysis in this section is by subsampling. I provide the interaction terms specification-approach to test the statistical significance of the heterogenous variables

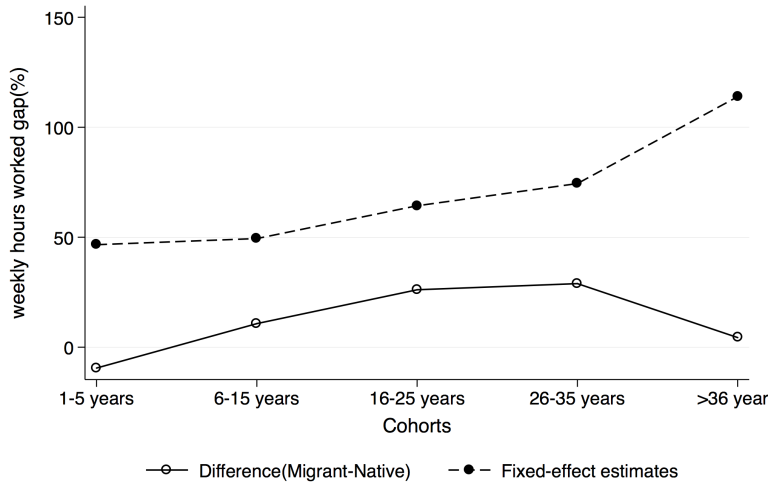


FIGURE 3.5 – FIXED-EFFECT ESTIMATE VS. SIMPLE AVERAGE DIFFERENCE

results are presented in the Table 3.6. It reveals that the superior earning assimilation profile varies between cities, by category of intermarriage and by migration distance but not by gender. Fast growing cities such as Tangerang and Makassar are destination that the key result hold. On the other hand, a less attractive cities such as Samarinda yield an opposing economic assimilation profile for migrants in which their earnings is persistently lower than those of natives. I argue that different city maturity might have attracted migrants who differ in quality Effendi et al. (2010), and hence, the assimilation profiles could differ among cities.

The main estimates hide several possible heterogeneities of economic assimilation profiles of the rural–urban migrant. Meng and Gregory (2005), in the Australian context, show that people who are intermarried, including migrants, have significantly higher earnings than those who are endogamous. As for the Indonesian case, intermarriage seems to explain largely the rapid assimilation profile of earnings. Intermarriage seems to be the mechanism for the intermarried migrant to absorb the city's human capital faster than those who are endogamous.

Further, migration distance also matters for migrant selectivity and so their economic assimilation profile. Estimates by migration distance suggest that within-

in the Appendix section, see Table 3.11 and Table 3.12. They show that the interaction terms of the key variable dummy a the heterogenous factors are mostly statistically significant. It suggests that the heterogeneity of assimilation profile by these factors exists.

island migration seems to be the case of a positive selection of the migrant workers from rural to cities. It indicates that higher skill transferability occurs between hosting and destination region that have proximate location and, perhaps, a similar sectoral composition. This heterogeneity indicates that the archipelagic setting which entails higher cost-of migration, however, still creates a hurdle for migrating in Indonesian context.

Lastly, by gender dimension, females perform less than the males in the assimilation process. This dissimilarity performance indicates that among the household heads, there is a quality difference between female and male migrant worker engaged in the city labor market with males being more positively selected than females from the sending region.

3.6 Conclusion

The chapter aims to measure the economic assimilation of internal migrant in Indonesia as a case study which have a less restrictive policy than countries in Asia such as China and Vietnam. The individual panel data of RUMiI is used to obtain a precise measure from the cohort effect bias and individual heterogeneity bias.

Results in this paper show that Indonesia's rural–urban migrants do not experience earnings penalty upon arrival in the cities and have a persistent higher earnings level relative to urban natives over time. Results show rural–urban migrant economic assimilation profiles that exhibit the second type of hypothesised profile. In other words, increasing permanent gaps are observed for the migrants relative to urban natives. The permanent gaps are superior for the migrants in the case of earnings but inferior as regards the mental health condition. These results on earnings are partially in line with the existing literature on Indonesia. Manning and Alisjahbana (2010) find that recent migrants have lower earnings compared with urban natives, but lifetime migrants have higher earnings. Their findings suggest the first type of assimilation profile. Migrants to cities start with an earnings penalty, but over time, the gaps are narrowed by human capital transferability.

These findings of the Indonesian economic assimilation profile are quite similar

TABLE 3.6 – HETEROGENOUS EARNING ASSIMILATION ESTIMATES

	Cities				Intermarriage status		Gender		Migration distance	
GROUP	Medan	Tangerang	Samarinda	Makassar	Endogamous migrant	Exogamous migrant	Male	Female	Inter-island	Within-island
1–5 years		0.798***	-0.995***	0.727***	-0.101***		0.416***		-0.769**	0.688***
		(0.148)	(0.131)	(0.054)	(0.036)		(0.106)		(0.282)	(0.106)
6–15 years	-0.004	0.916***	-1.216***	0.813***	-0.032	0.169	0.459**	0.053	-0.614	0.671***
	(0.108)	(0.202)	(0.159)	(0.182)	(0.069)	(0.143)	(0.164)	(0.238)	(0.403)	(0.151)
16–25 years	0.096	1.012***	-1.207**	1.489***	0.146	0.365**	0.646*	-0.288	-0.445	0.822***
	(0.124)	(0.270)	(0.497)	(0.490)	(0.295)	(0.170)	(0.272)	(0.397)	(0.619)	(0.192)
26–35 years	0.169	1.125***	-1.423**	1.896***	0.264	0.506**	0.760*	-0.762	-0.429	0.934***
	(0.167)	(0.296)	(0.537)	(0.582)	(0.297)	(0.242)	(0.286)	(0.544)	(0.655)	(0.223)
$\geq$36 years	0.754	0.991***	-1.377**	2.935***	0.669**	0.994***	1.146***		-0.425	1.444***
	(0.536)	(0.321)	(0.578)	(0.720)	(0.318)	(0.248)	(0.312)		(0.738)	(0.250)
Observations	659	753	504	424	1736	1383	2141	199	411	1929

to that in India by Khan (2017) but in contrast to that of a restricted internal migration setting, such as China (Ge, 2017) and Vietnam (Liu, 2017). Liu (2017) finds using a cross-sectional setting that rural–urban migrants have lower hourly earnings than urban natives. Some studies in the context of China, such as Ge (2017) or Zhang and Meng (2007), find that the rural–urban migrant in China experiences earnings penalty upon arrival followed by convergence.

The results of this chpater provide new evidence to a general pattern of standard assimilation process of rural–urban migrants in large developing economies, and it contrasts two resulting profiles from two different settings. The setting in this study, which exhibits no formal internal migration restriction, possesses a superior economic assimilation process relative to a setting that restricts internal migration flows.

However, the earnings assimilation profile is in line with a worsening mental health assimilation profile, which initially exhibits no mental health gap followed by a modest deteriorating of the mental health problem for every year since migration. These findings support the work of Lu (2010b), who employs IFLS data. She argues that the increased risk of psychological disorders for migrants is the result of reduced social support.

This paper tests both possible causes of the increasing pressure from longer hours worked (Fritjers et al., 2009) and lack of social support (Lu, 2010b; Meng and Xue, 2017). The results show that the latter cause is more relevant for the Indonesian context since the migrants' length of hours worked converges with those of natives over time. However, it shows a systematic decline of social support experienced by migrants relative to urban natives over time spent in the cities.

Appendix

3.A Additional figures and tables

3.A.1 Distribution of key variables

Figure 3.6 shows the distribution of some key variables to show that their shapes are identical so that the use of B–O decomposition that requires identical distribution is valid.

3.A.2 Hausman–Taylor specification

I use the following Hausman-Taylor estimator as a robustness purpose:

$$outcome_{it} = X1_{it} \cdot \delta_1 + X2_{it} \cdot \delta_2 + Z1_i \cdot \delta_3 + Z2_i\delta_4 + \alpha 2_i + \varepsilon 4_{it} \tag{3.6}$$

Hausman and Taylor (1981)—referred to as HT—formulated an instrumental variable estimator for panel data that controls for possible correlation between included variables and unobserved individual effects. It allows estimation of endogenous time-invariant variables. It requires that the number of included exogenous variables that are varying over both individuals and time are greater than the number of included endogenous variables that are time invariant. The specification: X refers to time varying variables and Z refers to time unvarying variables. Subscript 1 denotes assumed exogenous variables and subscript 2 denotes assumed endogenous variables. Time variant exogenous are age, gender; time variant endogenous are years of schooling, marital status, years since migrating (YSM); time invariant exogenous are city and province; and time invariant endogenous are cohort of arrival in city.

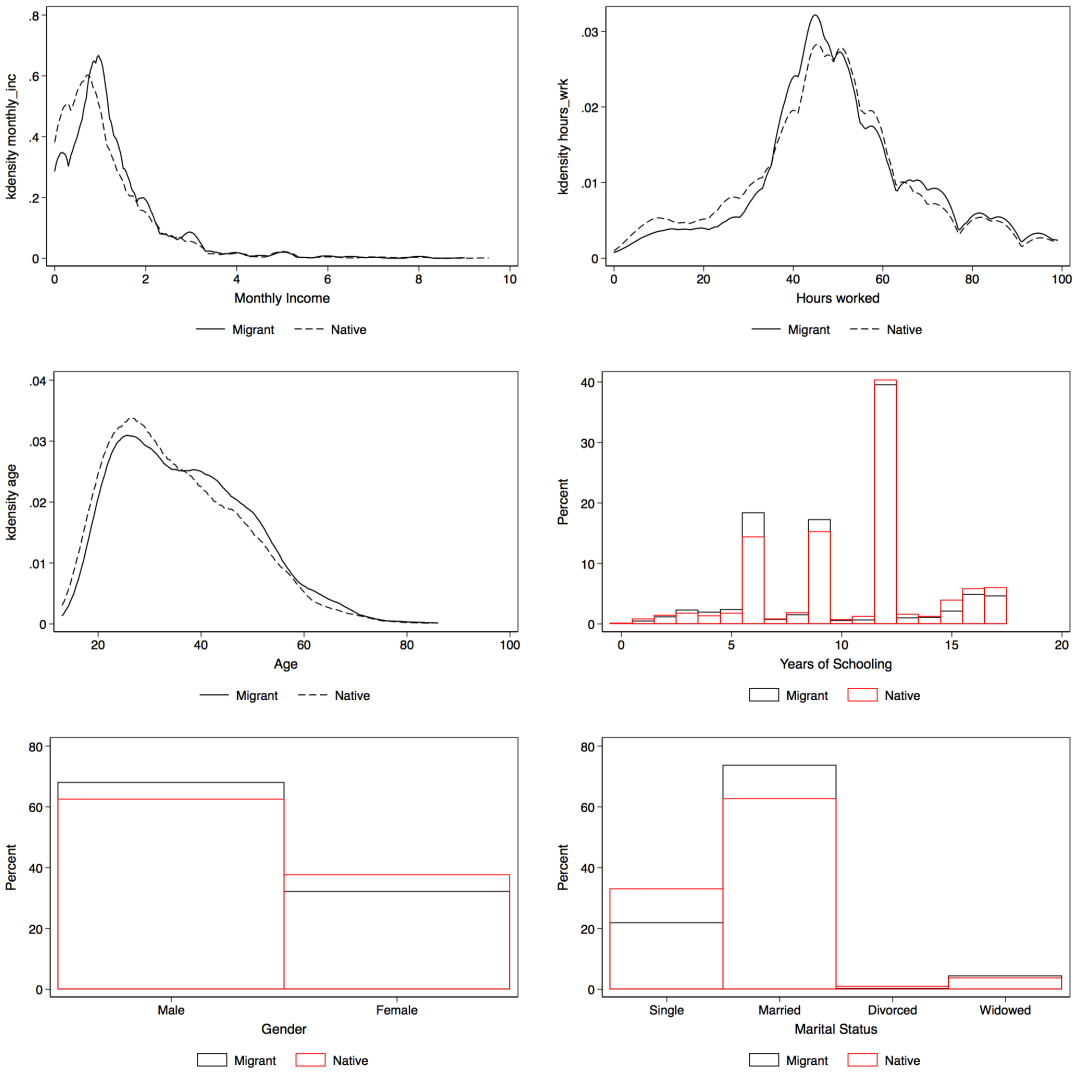


FIGURE 3.6 – DISTRIBUTIONS OF KEY VARIABLES

3.A.3 Alternative specification

This section provides the use of an alternative specification by Cobb-Clark et al. (2012) (Table 3.7). Instead of using the discrete of dummy variable, their specification utilises the integer value of YSM to capture the speed of assimilation. The gain from this functional form is that it can directly measure the yearly assimilation rate. In replicating their specification, I use the following equation to replace equation 3.5:

$$outcome_{it} = \mathbf{X}_{it}\delta + \sum COHORT_m\mu_m + \beta_1 AGE_{it} + \beta_2 AGE_{it}^2 + \beta_4 YSM_{it} + \beta_5 YSM_{it}^2 + \varepsilon_{it} \tag{3.7}$$

Basically, I replace the term time spent in cities groups with YSM_{it} and YSM_{it}^2. The alternative specification yields the estimate of yearly assimilation speed of about 9% with fixed-effect specification.

TABLE 3.7 – ALTERNATIVE SPECIFICATION FOR EARNING ASSIMILATION

Dependent variable: natural log of monthly earnings

Variables	Pooled OLS			Fixed-effect	Hausman-Taylor
	(1)	(2)	(3)	(4)	(5)
1–5 years	-0.017	0.127*	0.194***	0.153**	0.151
	(0.056)	(0.070)	(0.058)	(0.062)	(0.094)
Time spent in city	0.003	0.107***	0.126***	0.089**	0.124***
	(0.003)	(0.027)	(0.028)	(0.038)	(0.023)
Time spent in city^2/100	-0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Cohort dummies	No	Yes	Yes	No	Yes
Balanced panel	No	No	Yes	Yes	Yes
Observations	2991	2991	2340	2410	2340

Note: All specifications except FE include AGE, EDUCATION, GENDER, MARITAL, OCCUPATION, CITY, SENDING PROVINCE, and arrival COHORT. COHORT uses the finest definition. Standard errors are in parentheses and clustered at year-of-arrival level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

3.A.4 Attrition: dropout and remigration effect

The attrition of household heads in the sample entails two possible cases: a common dropout and a truncation such as death. Attrition might affect the outcome estimate, and it depends on the nature of the attrition bias. One favourable condition is if the outcomes are missing completely at random in which case, the missingness is independent of any outcome. If the outcome missing is independent of all missing outcomes conditional only on observed outcomes, the outcomes are missing at random (Daza et al., 2017). However, the nature of attrition of dropouts in the migration survey, in general, is about the missing at random case. Concerning the attrition bias of this category, the inverse-probability weights (IPW) may be used to ensure the consistency of the estimates provided that the data missingness model is correctly specified from observed covariates (Wooldridge, 2007). To test whether there are influencing observed variables to the dropout and then apply the IPW, I use the *xtrccipw* command provide by (Daza et al., 2017). The first two columns of Table 3.8 present estimates with and without the weighting and it barely changes the magnitude of the estimate, which suggests that the presence of bias owing to missing at random outcomes is not severe.

Another viewpoint for considering the attrition in the migration dataset is the remigration process. It is likely that the dropout samples are individuals who decide to return to the village (negative selection out of the city) or leave the city towards a higher-wage city or country (positive selection out of the city). In general, the remigration or stepwise migration processes are driven by an unobserved factor, such as ability, of which I do not have the measure. The use of panel data fixed effect might eliminate the bias originating from remigration assuming the conditional dependence of the missingness on unobserved that is time invariant, such as ability (Abramitzky et al., 2014). The ability components will be eliminated in both the comparison of migrant and native and the comparison of migrants in each cohort. The last two columns of Table 3.8 present the fixed-effect estimates between two specifications with a full sample and only with a balanced sample, and it shows insignificant differences in the coefficients.

TABLE 3.8 – THE ESTIMATE WITH AND WITHOUT THE INVERSE-PROBABILITY WEIGHTS (IPW) AND FIXED EFFECT WITH FULL AND BALANCED SAMPLE ONLY

Variables	Pooled OLS		Fixed-effect	
	without IPW	with IPW	full sample	balanced panel
	(1)	(2)	(3)	(4)
YSM group				
1–5 years	0.643***	0.628***	0.483***	0.483***
	(0.032)	(0.030)	(0.097)	(0.097)
6–15 years	0.850***	0.881***	0.555***	0.555***
	(0.060)	(0.075)	(0.142)	(0.142)
16–25 years	1.253***	1.286***	0.712***	0.712***
	(0.182)	(0.184)	(0.250)	(0.251)
26–35 years	1.329***	1.399***	0.816***	0.816***
	(0.206)	(0.215)	(0.263)	(0.263)
$>$ 36 years	1.875***	1.844***	1.219***	1.219***
	(0.235)	(0.258)	(0.291)	(0.291)
Age	0.079***	0.074***	0.152***	0.152***
	(0.010)	(0.010)	(0.036)	(0.036)
Age^2	-0.001***	-0.001***	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Years of schooling	0.071***	0.073***	0.010	0.010
	(0.007)	(0.006)	(0.012)	(0.012)
Gender = female	-0.243***	-0.242***		
	(0.060)	(0.071)		
Marital = married	-0.032	-0.049	-0.199	-0.199
	(0.074)	(0.067)	(0.225)	(0.225)
Marital = divorced	-0.271***	-0.126	0.075	0.075
	(0.090)	(0.128)	(0.299)	(0.300)
Marital = widowed	-0.458***	-0.467***	-0.413***	-0.413***
	(0.110)	(0.105)	(0.150)	(0.150)
Occu = public emp.	0.397***	0.393***	0.427***	0.427***
	(0.046)	(0.040)	(0.149)	(0.149)
Occu = self-emp.	0.082	0.079	0.227**	0.227**
	(0.061)	(0.063)	(0.111)	(0.112)
City = Tangerang	0.087	0.083		
	(0.094)	(0.091)		
City = Samarinda	0.129	0.149		
	(0.122)	(0.121)		
City = Makassar	0.037	0.082		
	(0.140)	(0.134)		
Province fixed effect	Yes	Yes	No	No
Constant	-3.207***	-3.194***	-4.720***	-4.752***
	(0.409)	(0.402)	(0.730)	(0.742)
R2	0.270	0.277	0.162	0.162
Observations	2991	2887	2991	2409

Note: The number of observations in the second column is slightly lower because of failure in generating weights for some observations owing to nonconvergence with the full sample. Standard errors are in parentheses and clustered at year-of-arrival level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

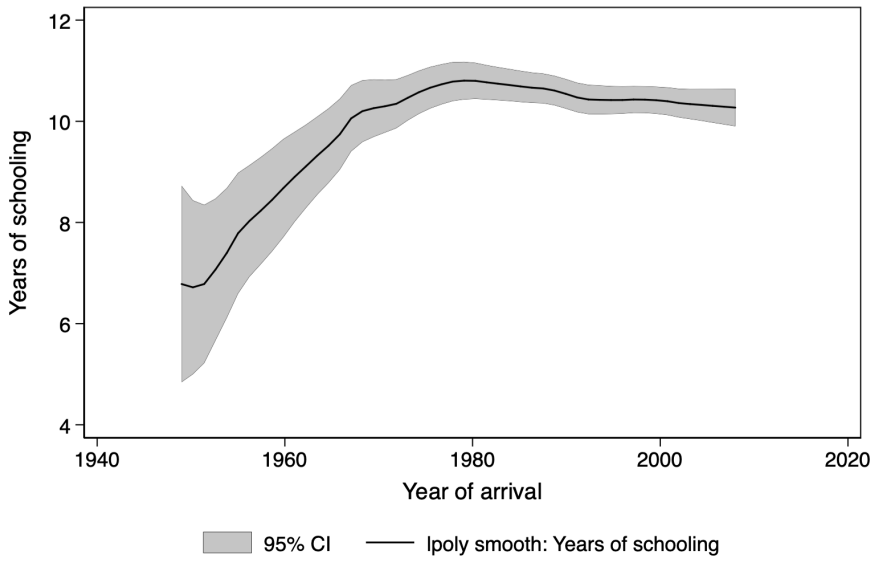


FIGURE 3.7 – AVERAGE YEARS OF SCHOOLING BY COHORT

3.A.5 Full estimates

Table 3.9 and Table 3.10 provide all coefficients of the covariates used in the estimates for all outcomes.

3.A.6 Dynamics quality across cohorts

Figure 3.7 shows the average of years of schooling by times arrival (cohorts) as a proxy of quality of migrant in the labour market.

3.A.7 Heterogenous significance-test

This section provides the estimation results of each variable of interest for heterogenous analysis as the interaction terms with the main variable of interest. Table 3.11 and Table 3.12 provides the estimation results.

TABLE 3.9 – MAIN OUTCOMES—FULL ESTIMATE RESULTS

Variables	Earnings				Mental health			
	Pooled OLS		FE	HT	Pooled OLS		FE	HT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1–5 years	0.643***	0.671***	0.466***	0.611***	0.430***	0.481***	0.339***	0.470***
	(0.032)	(0.035)	(0.103)	(0.068)	(0.019)	(0.014)	(0.037)	(0.030)
6–15 years	0.850***	0.857***	0.494***	0.790***	0.770***	0.872***	0.508***	0.787***
	(0.060)	(0.049)	(0.160)	(0.101)	(0.037)	(0.027)	(0.058)	(0.055)
16–25 years	1.253***	1.237***	0.643**	1.087***	1.005***	1.131***	0.553***	0.983***
	(0.182)	(0.204)	(0.265)	(0.218)	(0.101)	(0.121)	(0.140)	(0.135)
26–35 years	1.329***	1.480***	0.744**	1.303***	1.128***	1.227***	0.453*	1.009***
	(0.206)	(0.214)	(0.280)	(0.217)	(0.123)	(0.175)	(0.240)	(0.201)
≥36 years	1.875***	2.017***	1.139***	1.896***	1.498***	1.642***	0.599*	1.343***
	(0.235)	(0.236)	(0.308)	(0.231)	(0.203)	(0.240)	(0.317)	(0.276)
Age	0.079***	0.075***	0.155***	0.136***	0.006	0.004	0.059***	0.040***
	(0.010)	(0.012)	(0.036)	(0.019)	(0.004)	(0.005)	(0.020)	(0.008)
Age-squared	-0.001***	-0.001***	-0.001**	-0.001***	0	0	0	-0.000***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Years of schooling	0.071***	0.068***	0.014	0.043***	-0.020***	-0.018***	-0.002	0.024
	(0.007)	(0.010)	(0.012)	(0.014)	(0.003)	(0.003)	(0.023)	(0.018)
Gender = female	-0.243***	-0.308***		-0.407***	0.048	0.120***		-0.175*
	(0.060)	(0.080)		(0.083)	-0.035	-0.041		(0.094)
Marital = married	-0.032	-0.069	-0.172	-0.201	-0.069**	-0.021	-0.145*	-0.244
	(0.074)	(0.089)	(0.234)	(0.207)	(0.027)	(0.033)	(0.077)	(0.155)
Marital = divorced	-0.271***	-0.399***	0.087	0.041	-0.016	-0.007	-0.219*	-0.181*
	(0.090)	(0.101)	(0.310)	(0.230)	(0.038)	(0.033)	(0.114)	(0.107)
Marital = widowed	-0.458***	-0.577***	-0.432**	-0.569***	-0.028	-0.006	-0.066	-0.236***
	(0.110)	(0.135)	(0.163)	(0.141)	(0.056)	(0.056)	(0.102)	(0.085)
Occu = public emp	0.397***	0.421***	0.480***	0.471***	-0.028	-0.028	-0.254	0.065**
	(0.046)	(0.056)	(0.144)	(0.073)	(0.029)	(0.039)	(0.213)	(0.030)
Occu = self-empl.	0.082	0.130*	0.237**	0.158**	0.030*	0.042***	0.054*	0.172**
	(0.061)	(0.07)	(0.11)	(0.08)	(0.016)	(0.015)	(0.028)	(0.07)
City = Tangerang	0.087	0.129		0.553***	-0.006	0.02		0.151
	(0.094)	(0.133)		(0.155)	(0.04)	(0.04)		(0.102)
City = Samarinda	0.129	0.235		0.738***	-0.092*	-0.015		0.189
	(0.122)	(0.166)		(0.211)	(0.052)	(0.047)		(0.161)
City = Makassar	0.037	0.096		0.805***	-0.102*	-0.026		-4.331*
	(0.140)	(0.178)		(0.230)	(0.057)	(0.057)		(2.260)
Constant	-3.207***	-2.821***	-4.909***	-18.156**	2.207***	2.212***	-0.412	
	(0.409)	(0.358)	(0.772)	(8.946)	(0.110)	(0.153)	(0.460)	
N	2991	2340	2340	2340	3091	2410	2410	2410
COHORT Dummy	Yes	Yes	No	Yes	Yes	Yes	No	Yes
PROVINCE Dummy	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Balanced panel	No	Yes	Yes	Yes	No	Yes	Yes	Yes

TABLE 3.10 – CHANNEL OUTCOMES—FULL ESTIMATES RESULTS

Variables	Working hours				Social support			
	Pooled OLS		FE	HT	Pooled OLS		FE	HT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1–5 years	-4.974***	7.478***	11.471***	10.072***	-0.691***	-0.796***	-0.272***	-0.541***
	(1.071)	(0.807)	(1.651)	(1.545)	(0.028)	(0.023)	(0.062)	(0.049)
6–15 years	-13.994***	-5.886	10.142***	6.378*	-1.449***	-1.474***	-0.479***	-1.024***
	(2.165)	(4.600)	(3.344)	(3.533)	(0.116)	(0.158)	(0.161)	(0.168)
16–25 years	-40.570***	-14.573**	3.339	-2.848	-2.224***	-2.292***	-0.696***	-1.546***
	(13.057)	(6.168)	(6.030)	(6.043)	(0.125)	(0.181)	(0.186)	(0.188)
26–35 years	-49.527***	-22.523***	-1.269	-9.676	-2.987***	-2.966***	-0.976***	-2.079***
	(13.398)	(6.992)	(7.616)	(7.013)	(0.189)	(0.189)	(0.288)	(0.213)
≥36 years	-52.310***	-16.470**	2.807	-9.278	-4.182***	-4.194***	-1.602***	-3.152***
	(13.667)	(6.959)	(8.395)	(7.442)	(0.198)	(0.200)	(0.299)	(0.214)
Age	0.067	-0.201	0.008	0.134	-0.049***	-0.045***	-0.269***	-0.247***
	(0.525)	(0.400)	(0.782)	(0.551)	(0.009)	(0.008)	(0.053)	(0.030)
Age-squared	-0.003	-0.001	-0.018**	-0.005	0.000***	0.000***	0.001	0.002***
	(0.005)	(0.004)	(0.009)	(0.006)	0.000	0.000	(0.001)	0.000
Years of schooling	-0.445**	-0.547***	0.168	-0.499	0.037***	0.036***	-0.033**	-0.074***
	(0.174)	(0.196)	(0.542)	(0.383)	(0.006)	(0.007)	(0.015)	(0.016)
Log of monthly earnings	0.527	2.456***	3.542***	2.155**				
	(1.115)	(0.743)	(1.128)	(0.900)				
Working hours					0.001**	0.002***	0.002**	0.002**
					0.000	0.000	(0.001)	(0.001)
Gender = female	1.234	1.244		-2.437	0.012	0.046		-0.048
	(1.605)	(1.757)		(2.541)	(0.055)	(0.058)		(0.109)
Marital = married	7.681***	11.055***	3.152	2.993	-0.059	-0.058	0.067	0.123
	(2.717)	(3.011)	(2.825)	(3.534)	(0.054)	(0.059)	(0.112)	(0.111)
Marital = divorced	14.575***	20.659***	16.126**	15.868*	-0.153**	-0.140**	-0.203	-0.178
	(3.511)	(4.419)	(6.647)	(9.585)	(0.075)	(0.065)	(0.195)	(0.191)
Marital = widowed	0.447	4.745	-0.593	0.407	0.005	-0.041	0.031	0.283
	(3.204)	(3.144)	(3.396)	(4.344)	(0.073)	(0.069)	(0.145)	(0.187)
Occu = public emp	-7.540***	-10.041***	1.135	-9.075***	0.130***	0.194***	-0.036	0.520***
	(2.140)	(2.755)	(4.821)	(2.312)	(0.047)	(0.043)	(0.217)	(0.107)
Occu = self-empl.	3.752**	0.819	-0.134	0.846	-0.048*	-0.067*	-0.134**	-0.112
	(1.833)	(1.062)	(1.902)	(1.047)	(0.028)	(0.034)	(0.051)	(0.069)
City = Tangerang	-2.268	-4.968		-5.917	0.249***	0.177*		0.153
	(4.122)	(3.978)		(3.944)	(0.077)	(0.094)		(0.157)
City = Samarinda	-1.526	-3.729		-4.106	0.251***	0.172		0.365*
	(3.580)	(4.233)		(4.325)	(0.086)	(0.122)		(0.196)
City = Makassar	-7.886**	-10.695**		-11.648**	0.239**	0.158		0.371
	(3.494)	(4.590)		(4.631)	(0.117)	(0.159)		(0.243)
Constant	75.107***	67.245***	74.090***	-2.777	4.342***	4.831***	12.525***	8.463***
	(12.018)	(7.922)	(20.187)	(117.637)	(0.140)	(0.237)	(1.025)	(0.525)
N	2986	2336	2336	2336	2889	2264	2264	2264
COHORT Dummy	Yes	Yes	No	Yes	Yes	Yes	No	Yes
PROVINCE Dummy	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Balanced panel	No	Yes	Yes	Yes	No	Yes	Yes	Yes

TABLE 3.11 – HETEROGENOUS SIGNIFICANCE-TEST (1)

Variables	By city	By intermarriage	By gender	By distance
1-5 years=1	0.624***	0.283***	0.649***	0.701***
	(0.21)	(0.02)	(0.01)	(0.02)
6-15 years=1	0.521***	0.491***	0.815***	0.722***
	(0.11)	(0.05)	(0.04)	(0.05)
16-25 years=1	1.051***	0.885***	1.231***	1.182***
	(0.20)	(0.23)	(0.21)	(0.21)
26-35 years=1	1.245***	1.128***	1.441***	1.409***
	(0.24)	(0.24)	(0.22)	(0.22)
>36 years=1	1.784***	1.676***	1.952***	2.008***
	(0.28)	(0.26)	(0.25)	(0.25)
Intermarriage dummy		-0.200***		
		(0.01)		
Female dummy			-0.709***	
			(0.03)	
Interisland dummy				0.290***
				(0.02)
Tangerang	-0.022**			
	(0.01)			
Samarinda	0.218***			
	(0.01)			
Makassar	-0.100***			
	(0.01)			
1-5 years=1 # Tangerang	0.082			
	(0.22)			
1-5 years=1 # Samarinda	-0.075			
	(0.15)			
1-5 years=1 # Makassar	-0.15			
	(0.27)			
6-15 years=1 # Tangerang	0.313***			
	(0.09)			
6-15 years=1 # Samarinda	0.273**			
	(0.13)			
6-15 years=1 # Makassar	0.292***			
	(0.10)			
16-25 years=1 # Tangerang	0.164			
	(0.12)			
16-25 years=1 # Samarinda	-0.085			
	(0.12)			
16-25 years=1 # Makassar	0.127			
	(0.18)			
26-35 years=1 # Tangerang	0.172			
	(0.15)			
26-35 years=1 # Samarinda	-0.231*			
	(0.14)			
26-35 years=1 # Makassar	0.450***			
	(0.14)			

TABLE 3.12 – HETEROGENOUS SIGNIFICANCE-TEST (2)

Variables	By city	By intermarriage	By gender	By distance
>36 years=1 # Tangerang	0.319			
	(0.32)			
>36 years=1 # Samarinda	-0.213			
	(0.23)			
>36 years=1 # Makassar	0.21			
	(0.45)			
1-5 years=1 # intermarriage dummy 1=yes		-0.013		
		(0.14)		
6-15 years=1 # intermarriage dummy 1=yes		0.210**		
		(0.10)		
16-25 years=1 # intermarriage dummy 1=yes		0.256***		
		(0.05)		
26-35 years=1 # intermarriage dummy 1=yes		0.204***		
		(0.08)		
>36 years=1 # intermarriage dummy 1=yes		0.478**		
		(0.19)		
1-5 years=1 # Female			0.615***	
			(0.14)	
6-15 years=1 # Female			0.514***	
			(0.12)	
16-25 years=1 # Female			-0.286	
			(0.37)	
26-35 years=1 # Female			0.001	
			(0.23)	
>36 years=1 # Female			0.212	
			(0.19)	
1-5 years=1 # interisland=1				-0.301***
				(0.08)
6-15 years=1 # interisland=1				0.017
				(0.09)
16-25 years=1 # interisland=1				-0.229**
				(0.09)
26-35 years=1 # interisland=1				-0.353***
				(0.09)
>36 years=1 # interisland=1				-0.657**
				(0.26)
Constant	-2.841***	-2.712***	-2.669***	-2.716***
	(0.24)	(0.23)	(0.23)	(0.23)
Observations	2340	1977	2340	2340

Note: Standard errors are in parentheses and clustered at year-of-arrival level with ***, **, and * indicating 1, 5, and 10% significant levels, respectively.

Chapter 4

Developing social capital for livelihood

Abstract

This chapter is on adding empirical evidence of the possibility of creating individual social capital through education. It tests the long-term effects on social skills formation of individuals exposed to state ideology indoctrination courses during their adolescence. Using the case of Indonesia, the empirical analysis investigates the long-term outcomes between individuals exposed to the massive Indonesian state ideology indoctrination courses during their schooling years and those who were not. The empirical strategy exploits the sudden and unexpected termination of the courses in 1998 as an RDD setting. The results of this chapter show that the courses had a positive but minor intermediate-term impact on cognitive but not on non-cognitive skills. Further, the estimates on social capital measures, such as trust and community participation, also consistently showing no impact. This chapter concludes that the role of state ideology indoctrination courses of the type seen in Suharto's Indonesia might on individual social capital formation is limited.

4.1 Introduction

Social capital influences the livelihood development of individuals since its positive form affects key economic outcomes, such as reducing poverty (Cleaver, 2005;

Narayan and Pritchett, 1999), increasing income (Zhang and Anderson, 2011), improving food security (Levien, 2015; Martin et al., 2004) and reducing violent crime (Lederman et al., 2002). On the other hand, a perverse social capital also may lead to an adverse effect such as an increasing civil violent along with the existence of underground economy in Colombia (Rubio, 1997). Despite the opposite effect of social capital, researcher have used the concept in social sciences and economics. As for economics research in particular, in addition to the concept of standard physical capital, the notion of social capital has demanded attention in development analysis because of its nature of participatory, sustainability and the contextualisation of the social dimension of development (Bebbington et al., 2004; Woolcock, 1998). Moreover, the definition and concept of social capital also have evolved and covered a wide range of views and interpretations.

Pierre Bourdieu defines social capital as follows: 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance or recognition' (Bourdieu, 1986). Other scholars emphasise the element of possession of social ties and collective action in their definitions of social capital (Bloch et al., 2007; Fukuyama, 2001). Further, social capital can simply be defined as community resources that increase the welfare of that community (Glaeser, 2001). The bottom line of the role of social capital is thus inferred as arising from the function of collective action in improving efficiency (Ostrom, 1994).

Some empirical tests have shown that collective actions improve social outcomes by correcting market failures, such as correcting information asymmetry for local decision-making (Olken, 2010) and monitoring local governance for public goods provision (Olken, 2007), and improve social targeting precision (Alatas et al., 2012). Social capital is also found to play a role in securing income fluctuation by informal insurance from friends, neighbours, and the community to maintain welfare (Munshi and Rosenzweig, 2016).

Numerous studies examine the role of social capital on social outcomes. However, analyses that place social capital on the left-hand side, that is, analyses examining social capital formation, have been so far relatively limited. A larger body of literature empirically tests the importance of community development programs

to build social capital, acknowledging the notion of social capital as a measure at the community level (Dale and Newman, 2008; Olken, 2010; Torres-Vitolas, 2017; Woodhouse, 2001; Woolcock and Narayan, 2000). This approach argues that social capital is an aggregate outcome at the community level, which can be enhanced by stimulating the community to perform a collective action. Examples of this community development program would be such as the Prodepine in Ecuador (Bebbington et al., 2004) or the Kecamatan Development Program in Indonesia (Guggenheim et al., 2004). The conclusions, so far, have been as follows. Such a program yields mixed results as regards whether it promotes community social capital (Labonne and Chase, 2011), has limited ability to maintain the local social structure, and results in other problems such as corruption, including elite capture (Woodhouse, 2001) and unfavourableness to vulnerable groups (Torres-Vitolas, 2017).

A large body literature has investigated how social capital formation occurs at the individual level through education since the seminal work by Haveman and Wolfe (1984). These studies use human capital framework and introduced social capital as one of non-market returns on education. Among others, is the framework introduced by Glaeser (2001), who postulated the investment towards individual social capital as an analogue to investment in individual human capital. He suggests two possible interventions to promote social capital formation at the individual level, education and environment, that is, ethnicity heterogeneity.

The investigation in the present chapter considers the potential role of education/training in the formation of personal social capital. It focuses on private educational experience that promotes collective action and hence creates social capital at the individual level during adolescence. In particular, this chapter tests the impact of students' exposure to the Indonesian state ideology indoctrination courses, commonly called as the P4 training. P4 is an abbreviation of *Pedoman Penghayatan dan Pengamalan Pancasila* which can be translated as of 'The Guidelines for Understanding and Practices of Pancasila (the Indonesian state ideology)'. The training was part of their high school (junior and senior) and university education within the period 1978–1998, i.e. during the Suharto's presidency. My main outcome of interests is on students' social skills or personality traits related to social capital, such as agreeableness, openness, extraversion, emotional stability, and ex-

traversion. Further, I also test the long–run effect on standard measure of social capital, trust and social participation.

The sudden discontinuation of these state ideology indoctrination courses in 1998 owing to the political reform (*Reformasi*) provides a natural experiment that allows us to test the effect of the programme on individual social capital. The birth cohort exposed and the one not exposed because of the discontinuation are valid treatment and counterfactual groups to test the long-term impact of the courses taught in the P4 programme on elements of individual social capital.

This analysis aims to add empirical findings in the literature in the sense that I focus on a large-scale, education-embedded intervention that has consequence on individual social capital. The empirical finding of this chapter is expected to add variety of result for nation building literature Alesina et al. (2013) and persuasion literature DellaVigna and Gentzkow (2010). Note that Indonesia is the fourth most populous country in the world, after China, India and the US. This national program did significantly absorb the state's fund and involve large number of trainers all over the country. It might not be as radical as the Chinese Cultural Revolution, 1966 until 1976. The intention to reform societies' social capital might be, however, more or less similar.

The rest of the chapter is organised as follow. Section 4.2 explains the framework, Section 4.3 describes a background of the state ideology indoctrination courses, Section 4.4 formulates the empirical strategy, Section 4.5 describes the data, Section 4.6 presents the results, and Section 4.7 provides discussion and interpretation and Section 4.8 concludes.

4.2 Conceptual framework

4.2.1 Social skills formation during adolescence

This section outlines the stock of individual elements of social skills (S_t) formation in the spirit of (Cunha and Heckman, 2007) as the following. S_t comprises cognitive skills (e.g., a piece of knowledge that one should trust others) and noncognitive skills (e.g., extroversion and agreeableness). Let assume that S_t is formed in a multistage technology during individuals' lifecycle period, for example, early childhood,

adolescence and adulthood, and that each stage can have different technologies. The input in every stage is a parental investment, schooling, social environment, individual investment (e.g., participating in the social club) or policy intervention to produce outputs, that is, social skills at the next stage. The production function of such skill at time $t+1$ is:

$$S_{(t+1)} = f_t(S_t, I_t) \tag{4.1}$$

For all past inputs, the current stock of social skills for an individual born with the initial condition of S_1 is

$$S_{(t+1)} = f_t(S_1, I_1, I_2, I_t) \tag{4.2}$$

The framework further assumes a positive and diminishing return on investment in every stage, that is, the production function f_t is increasing and concave with respect to I_t. However, every stage may have a different productivity level, such as the same noncognitive skills investment made at adolescence yields a higher return than at adulthood. If period t^* is a "golden period" for producing noncognitive skill $S_{(t+1)}$, then holding other inputs constant, interventions that affects this outcome are more profound than in other stages $(s \neq t*)$.

$$(\partial S_{(t+1)})/(\partial I_s) < (\partial S_{(t+1)})/(\partial I_t^*), \text{for all } s \neq t* \tag{4.3}$$

In an empirical application, I test the hypothesis that massive state ideology indoctrination courses as one of policy intervention given during one's adolescence years could affect one's social skill lifecycle.

I also test the interactions between inputs over time. For example, whether education intervention could yield higher S_{t+1} = inter–ethnic trust for individuals with better past inputs, such as living in a more heterogeneous ethnic environment than individuals with a homogeneous environment. There would also be other inputs that could also matter, such as gender dimension and, parental investment, for the interaction assumption or a growing fate at regional community toward central government who implemented the policy intervention also matters.

4.2.2 The intermediate–term and long–term effect

The analysis in this chapter divides outcomes into two categories. First is outcomes related to intermediate effect of the courses: a cognitive skills evaluated

reative–shortly after the program and a non–cognitive skills developed during the period of programme implementation. As for the cognitive skill measure, the exit score for knowledge related to the state ideology is used. The non-cognitive skills are measured using the element the big five personality factors that are related to social capital, namely agreeableness, openness, extraversion, emotion stability and consciousness (Roberts et al., 2005).

Second is social capital outcomes related to long-term effect of the programme. I use two standard measures: trust and community participation. These outcomes are observed when these individuals have become adult.

4.3 The state ideology indoctrination courses in Indonesia

In 1973, the Indonesian government governed by the late President Soeharto, also known in Indonesia as the New Order government, started a massive construction of primary schools all over the country to increase access to education to all Indonesian children. By 1978 more than 61 thousand primary schools were built; increasing primary school enrolment rate among children aged 7 to 12 from 69 % in 1973 to 83 % in 1978 (Duflo, 2001). To further increase enrolment rate among children in 1984, the government set a compulsory elementary (6 years) education program (known as *Wajib Belajar* or *Wajar*) among children. The length of this compulsory education later on in 1994 was increased to 9 years.

Given this above background of a relatively successful in increasing school enrolment rate among children, in 1978, the government introduced state ideology indoctrination courses, called as the *Penataran* P4 or the P4 training, as part of the Indonesian education system. Any Indonesian citizen entering formal education at junior or senior high school or university level, that is their adolescence period, from 1978 to 1998, was likely participating in this state ideology indoctrination courses. The training typically was in a form of a week's intensive workshop in the beginning of junior or senior high school or university. The training was also expanded in the non–education sector on an ad–hoc basis, such as during the orientation days of civil servant recruits and some farmers' association events

(Nishimura, 1995). However, this chapter does not focus on this type of program because of the difficulty in identifying the participants.

The state ideology indoctrination courses was massive and intense in the sense that it was supported by the strong environment of a strong government that had a full back up from the military. The program was designed by a group of civilian and military intellectuals who are loyal to Soeharto. The training was implemented throughout the country and supported by all government institutions.

Social environment situation at that time could be illustrated by the fact that most of the media campaigns were engineered by the government to support the effectiveness of these ideology indoctrination courses (Aditjondro, 1994; Aditjondro and Kowalewski, 1994). For these reasons, one would expect that the program would have strongly influenced an individual's noncognitive skills related to social capital. It was politically incorrect for Indonesians in the New Order period to criticise the norms and values introduced by the course. One could face the risk of social sanction in case one criticised it.

The state ideology indoctrination courses was an inclusion of the new 'interpretation' of the state ideology as teaching materials in schools—not only public schools but also private schools. They tried to ensure that the state ideology became the citizen's inherent social norms and values (Nishimura, 1995). These state ideology indoctrination courses were given at various levels, mostly during (junior and senior) high school and university years.

The main content of this state ideology indoctrination courses is practical interpretation and guidance of the state ideology, which consisted of 36 items derived from the five pillars of the state ideology, *Pancasila*. Some of the state ideology indoctrination courses items emphasise the norm to enhance social engagement, trust, and collective action, which are the elements of social capital.

The courses was suddenly abandoned in 1998 at the same time that the Soeharto regime fell, and along with the demands for national political reform, the *Reformasi*. Therefore, Indonesian citizens entering junior high school in 1999 will never participate in this state ideology indoctrination courses.

This chapter investigates of an open question whether the state ideology indoctrination courses could have formed the long-term social skills of individuals? The

possibility that it potentially has an effect is due to the fact that it taught norms and values encouraging collective actions, it occurred at the 'golden period', that is, adolescence period and it happened during a 'well-supported environment' of Indonesia's dictator, Soeharto. Nonetheless, the program was too superficial in its form and only last a week also raise a doubt of its power in creating such effect. I let the two competing hypotheses as an open question and test them empirically.

4.4 Empirical method

4.4.1 The discontinuity setting

There are three fundamental elements of a Regression Discontinuity Design (RDD) setting: a running variable, a cut-off and a treatment. The introduction of the state ideology indoctrination courses in 1978 and unexpectedly and sudden discontinuation of the courses in 1998 provide an opportunity to treat the implementation of the courses as a natural experiment and to exploit the events as an RDD setting. The discontinuation of courses provides a more reliable exogenous shock due to the sudden nature of the event than the introduction of the courses in 1978 that has been relatively gradual. This paper hence defines the state ideology indoctrination courses as the treatment.

To best of my knowledge, unfortunately, there is no publicly available data on individual participation in the state ideology indoctrination courses. Nevertheless, the age- and education-specific components of the course provide us the opportunity to extract information in the publicly available household survey data to reveal the course take up. If an individual was in the first year of junior or senior high school or university during the period 1978–1998, ignoring absenteeism or the school fails to deliver the courses at the time of the program, that individual should have participated in the program or treated, otherwise, they are not. Hence, the fact that the probability of receiving treatment changes abruptly in 1998 provides a key feature of RDD setting.

The running variable in this paper is the year X_i when an individual i experienced the first year in the junior high school with the cut–off equals to 1998. Thus, an individual is assigned as treated (participating in the state ideology indoctrina-

tion courses), $T_i = 1$, if $X_i \leq 1998$ and $X_i \geq 1978$.

Important to note, however, are as follows. First, the introduction of the state ideology indoctrination courses in 1978 was confounded by other major policies, such as compulsory 6 years education program in 1984 and compulsory 9 years education program in 1994. The effects of these policies are deemed to be asymmetrically applied only to the treatment cohorts and not the control cohort.

Second, as aforementioned, there was a euphoria to disregard norms and values associated with the New Order era. The euphoria seems to be uniformly experienced by most adult Indonesians who witnessed the reform, but not by young Indonesians in 1998. Its relevance to the analysis of this paper is that the euphoria will not invalidate my comparative analysis of the program effect as long as I do not mix the control group with young Indonesians who did not feel the euphoria. In other words, the correct use of bandwidth will be crucial for comparability purpose. The discussion on this issue is provided in heterogeneous analysis.

Third, another big event that accompanied the political turmoil was the 1998 economic crisis. This paper recognises the potential bias due to this event since the effects of economic crises are not symmetrically distributed across all cohorts. Thomas et al. (2004) show that the trend of increased enrolments among school-age children in Indonesia was dramatically reversed at the time of the crisis. Hence, the one possible mechanism for the bias is that the negative income shock by the crisis postpones one's enrolment to school which might lead to sorting issue for the RD setting. I address this issue in the falsification analysis.

4.4.2 The RDD framework

There are two alternative frameworks for implementing RD estimates: a continuity-based framework or local randomisation framework (Cattaneo et al., 2018). Both frameworks measure the impact estimates by taking the difference of local regressions' intercept at points close to the cut-off. The difference is that the first approach assumes a continuity of the outcome variable at the cut-off in the absence of the treatment and the latter approach assumes that there exists some X at around the cut-off so that observations are placed randomly as if a random experiment. Both assumptions justify the validity of exploiting the fact that observations

at below and above the cut-off are similar in most aspects except the treatment status to establish the causal link of the programme to the outcome of interest.

In addition to the difference assumption being used, the two frameworks prescribe different estimation techniques. The continuity-based framework uses a local-polynomial or a non-parametric regression within the optimal bandwidth while local randomisation framework utilises the difference between the average observed outcomes among observation below and above the cut-off within a small window around the cut-off.

I choose the local randomisation framework for two reasons. This approach requires a less restrictive assumption. Assuming that the local-randomisation exists implies that local continuity also exists but the reverse is not true (Cattaneo et al., 2018). Second, when the running variable takes a discrete value, a local-polynomial regression produces a low approximation error if there are large enough observations near the cut-off which is not the case of this study. The relationship between a discrete running variable and the outcome in my data exhibits a condensed "mass-point" that makes the local-randomisation estimates is suitable.

A general framework to implement a local-randomisation sharp RD design with a constant treatment effect (τ) for observations above the cut-off with a potential outcome of $Y_{i \in W_0^+}(1)$ and observations below the cut-off with a potential outcome of $Y_{i \in W_0^-}(0)$ within the window W_0 is :

$$Y_i(1) = Y_i(0) + \tau \tag{4.4}$$

which leads to null hypothesis $H_{\tau_0}^F : \tau = \tau_0 = 0$ with Fisherian (finite sample) inference framework (Cattaneo et al., 2018). I also implement a local randomisation sharp RD effect with Neyman approach for the large-sample approximation as a comparison.

Window selection is the most important step for implementing local–randomisation RDD framework. When the running variable takes a discrete value, a well–defined window is the smallest value, and this is the advantage of local–randomisation approach for an RDD with a discrete running variable. Therefore, the window selection procedure is no longer needed (Cattaneo et al., 2018). By default, I use $W_0 = [-1, 1]$.

4.5 Data and variables

There are two household data sets utilized in this paper: the Indonesia Family Life Survey (IFLS)–5 collected in 2014 and the Indonesian National Socio-Economic Survey (SUSENAS)'s Social and Culture Module collected in 2012. The datasets contained information on individual social capital, demography and social-economic information. IFLS–5, in general, contains much more rich information that SUSENAS. SUSENAS, however, all the Indonesian provinces and so providing representative information for the whole nation. Meanwhile, IFLS–5 only covers 13 provinces. Both datasets are used for robustness purpose and for checking the consistency of the results.

For IFLS–5, this paper uses the self-reported information on time entering junior high school (Question dl11a2) of the education section construct the X variable. Such a running variable definition raises two issues. First is about the accuracy of the X_i which depends on memory recall ability. Second, is about to what extent the subject can (perfectly) manipulate the running variable value so do their treatment status. To address the first issue, I perform a balance test on memory test. It indicates that no systematic bias due to recall ability as it is not statistically significant (see Appendix, Table 4.10). Nonetheless, I acknowledge that the running variable might be not perfect. As for the second concern, I employ a density test to qualify that there is no sorting issue regarding whether individual can choose to delay or to advance their admission to the first year of junior high school in relation to the state ideology indoctrination courses participation.

For generating the outcome variables, this paper utilises four sections of IFLS–5 data: education, personality, trust, and community participation. The personality section contains information on individuals' personality factors representing social skill, namely agreeableness, openness, extraversion, emotion stability and consciousness. Psychology literature suggests that the social skills measured by these traits are formed throughout multiple stages over the lifecycle, and there are noticeable golden periods at different points of life, such as early childhood, early adolescence, and early adulthood (Roberts et al., 2005; Skirbekk et al., 2015; Soto and Tackett, 2015). Hence, although the information on individuals' social skill is gather during the IFLS–5 survey, this paper assumes that such skills mostly

are formed during individuals' adolescence years which some individuals in the IFLS–5 are exposed to the state ideology indoctrination courses and some others are not.

For each factor, IFLS–5 asks three questions on a five–point Likert–type scale. The operational definition from the Likert scale is standardised using Z–scores for each of the five factors and then is averaged. Among the factors, extroversion, openness to experience, and agreeableness are used as social skill measures at the individual level.

The education section, besides providing information on time entering junior high school, contains junior high school exit score related to the five national principles subject, known as *Pendidikan Moral Pancasila* (PMP) or *Pancasila* Moral Education subject. The social skills available at the personality section and PMP scores available at the education section are utilised by this paper to proxy the non-cognitive and cognitive immediate effect of the courses, respectively.

The section on trust has information about the trust of neighbours and people in the village, and on tolerance of people of different faiths, which are considered the outcomes of interest in this paper. Trusts in this section are oriented towards a heterogeneous people since it has a context, for example, trust in other people by various dimensions, such as ethnicity and religion. The Likert–scale of these trusts is standardised using Z–scores for each of the five factors and then is summed.

The section on social participation records individuals' participation on community activities, such community meetings, cooperatives, and voluntary labour. Counting the number of types of community activity that an individual engages in allows us to proxy individual's social capital.

As for SUSENAS data, the running variable uses the birth of year with 1985 as the cut–off since I do not have information on when the individual entered school. Individual born in 1985 or earlier should have entered junior high schools in or before 1998. Therefore, they are expected to be treated. By such definition, the estimates using SUSENAS data are best interpreted as an intention to treat (ITT).

SUSENAS data provide two measures of social capital: the number of type of social activities (religious, skill, sport, art, saving, funeral, art, and other) in which an individual participates; and trust in various external parties (village head, vil-

TABLE 4.1 – SUMMARY STATISTICS

Panel A-IFLS

	Control			Treatment			Total		
	mean	SD	count	mean	SD	count	mean	SD	count
log(social skills)	0.83	0.16	808	0.83	0.16	787	0.83	0.16	1595
log(trust)	0.85	0.17	808	0.85	0.16	787	0.85	0.17	1595
log(participation)	-3.99	2.36	808	-3.91	2.4	787	-3.95	2.38	1595
PMP score	6.02	1.05	229	6.43	1.01	234	6.22	1.05	463
Age	27.98	1.50	805	29.01	1.65	782	28.49	1.66	1587
Year of Schooling	12.12	2.53	800	12.02	2.55	778	12.07	2.54	1578
Share of:									
Gender (male=1)	0.49	0.50	805	0.46	0.50	782	0.48	0.50	1587
Location(Urban=1)	0.64	0.48	808	0.63	0.48	787	0.63	0.48	1595
Islam	0.90	0.30	808	0.90	0.30	787	0.90	0.30	1595
Catholic	0.04	0.21	808	0.05	0.22	787	0.05	0.21	1595
Protestant	0.01	0.08	808	0.01	0.09	787	0.01	0.08	1595
Hindu	0.04	0.20	808	0.03	0.17	787	0.04	0.19	1595
Buddhist	0.00	0.05	808	0.00	0.05	787	0.00	0.05	1595
Household head is gov. emp.	0.09	0.29	808	0.10	0.29	787	0.09	0.29	1595
Panel B-SUSENAS									
log(trust)	1.37	0.18	453	1.39	0.17	492	1.38	0.18	945
log(participation)	0.99	0.49	453	1.01	0.5	492	1.00	0.49	945
Age	26	0	453	27	0	492	26.52	0.5	945
Year of Schooling	11.62	2.73	453	11.14	2.47	492	11.37	2.61	945
Share of:									
Gender(Male=1)	0.33	0.47	453	0.33	0.47	492	0.33	0.47	945
Location(Urban=1)	0.53	0.5	453	0.54	0.5	492	0.54	0.5	945

Note: The summary statistics uses observations within $W_0 = [-1, 1]$ and includes only individual who ever entered junior high schools in the 13 provinces of IFLS coverage. The rule applies also to SUSENAS data.

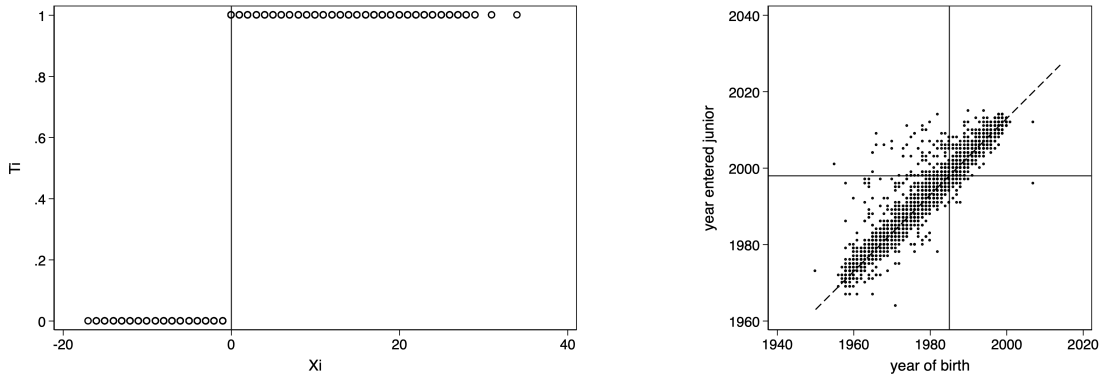
lage leader, local religious leader, and neighbour). The first measure is extracted from the individual and household–head level and the second measure is from the household–head level only. The sum of Z–score of the Likert–scale is computed to obtain the trust score.

All of these outcomes of interest are transformed into a natural log to ease the interpretation. The summary statistics of key variables are presented in Table 4.1.

4.6 Results

4.6.1 Treatment status

This section presents the result of the discontinuity in the treatment status and discuss whether subjects have influence on their position in the running variable and so the treatment status. Figure 4.1—Panel (a) plots the treatment status and running variable to show that the probability of receiving treatment changes abruptly at $X_i = 0$ for IFLS–5 data. The perfect jump is a result of imposing an assumption that all individual who entered junior high school before or in 1998 participated in state ideology indoctrination courses. Some cases make the actual take–up did not take place. First is absenteeism. Individuals might not participate if they were absent at the time of the workshop. Second, the student did not participate in the school which fails to deliver the program courses for many reasons. One of the examples is religious schools with a view of opposing Pancasila's values and refused to offer the workshop.



(a) Treatment status over running variable

(b) Year entering junior high school by birth cohorts

FIGURE 4.1 – TREATMENT STATUS

Note: The dashed line in panel b indicates plots of individual who entered junior high school exactly at 13 years old. The vertical line is at year of birth equals to 1985 when the last cohort exposed to the P4 program is expected to be born. The horizontal line is at the year of admission to junior high school equals to 1998.

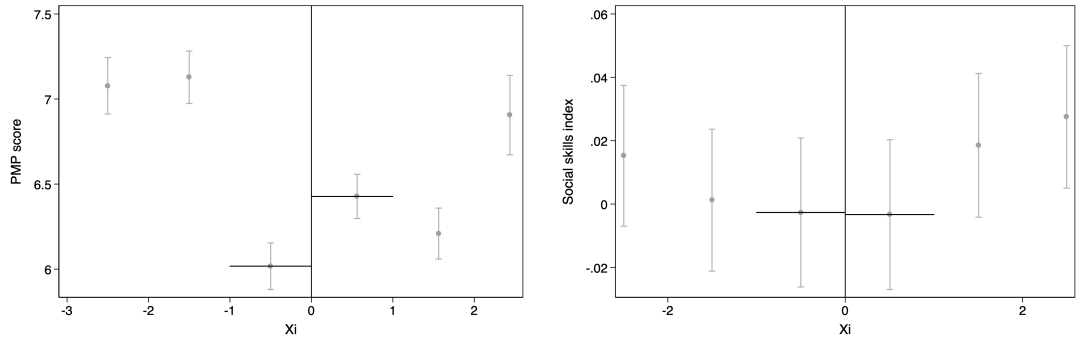
To address absenteeism issue, I use information on experiencing retention and disruption in the first year as a proxy of their absence during the workshop. IFLS–5

shows that retention rate and the proportion of individual with disruption in the first year is very low (0.8% and 0.6% respectively), making the absenteeism issue is ignorable. And, to address the school failure–issue, I exercise two estimates: one which includes all type of schools and one which only includes the public schools. The later subsampling is expected to limit the school failure in delivering the courses. I argue that the compliance of public school toward government programme during the New Order Era is likely to be perfect. I present the results in the heterogeneous analysis section.

The dashed line of Figure 4.1—Panel (b) passes dots that represent admission at the year recommended for school. The dots to the left of the line represent individuals who delay the admission and the dots to the right of the line represent individuals who forward the admission to school. Thus, we observe that individual can influence their position along years entered junior high school, that is the running variable. Our concern is to what extent this decision is related to the treatment status. Explicitly, whether individual delay or forward their admission to avoid (to be in) the state ideology indoctrination courses if the perceive a loss (gain) associated with their participation in the program. The density test indeed confirms this behaviour so that there is a minor drop in the number of observations just to the right of the cut-off. However, I argue that the drop is not because of subject's strategic decision in relation to benefit or loss related to their participation in the state ideology indoctrination courses, but it is due to adverse economic effect of the Asian Financial Crisis as I explain shortly in the robustness test section.

4.6.2 Intermediate-term effect

Figure 4.2 displays state ideology indoctrination courses intermediate-term effect on cognitive aspect (Panel A) and on non-cognitive skills (Panel B). Table 4.2 presents the estimates of equation 4.3 for these graphical representations. The effect on PMP subject–exit score is 0.41 out of a ten scale which corresponds to about 7% higher than the control group and statistically significant at 1% level. However, the effect on the non-cognitive skills related to social capital is small and not statistically significant. These results suggest that the program design was more toward shaping knowledge rather for developing the social skills.



(a) PMP score

(b) Social skills index

FIGURE 4.2 – EFFECTS OF THE P4 TRAINING ON PMP SCORE AND PERSONALITY-SOCIAL SKILLS INDEX

Note: The plot implements polynomial of degree zero or `p(0)` and bandwidth/window equals to one or `h(1)`. Dots represent the average value of the index by each bin or "mass point" of the running variables. The solid lines indicate the fitted values from a local polynomial specified and the grey lines are the 95% confidence interval.

TABLE 4.2 – EFFECT OF THE P4 TRAINING ON PMP SCORE AND PERSONALITY—SOCIAL SKILLS INDEX

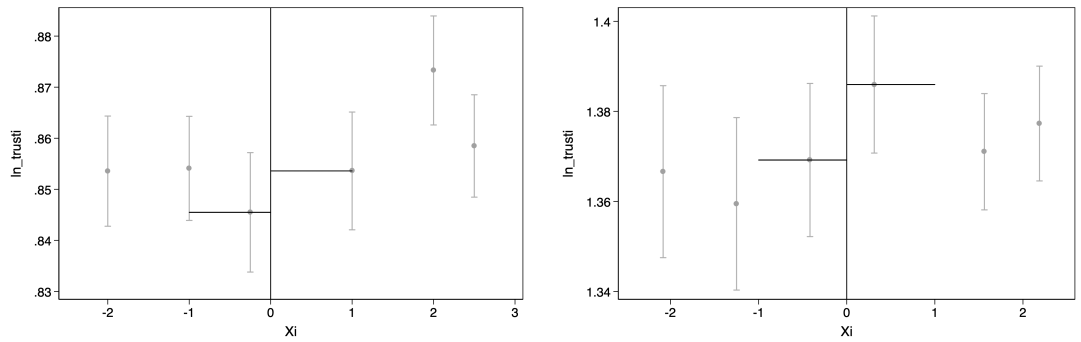
	Cognitive		Non-cognitive	
	PMP score	log(PMP score)	social skills index	log(social skills)
RDD-estimate	0.410	0.068	-0.001	0.000
P-value small	0.000***	0.000***	0.969	0.980
P-value large	-	-	0.976	0.985
Obs-left	229	229	808	808
Obs-right	234	234	787	787
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. All estimates include only individual who ever entered junior high schools in the 13 provinces of IFLS coverage. A smaller number of observations for cognitive estimates is due to lower response rate of questions on EBTANAS score in section DL than questions on personality in section PSN.

TABLE 4.3 – EFFECT OF THE P4 TRAINING ON TRUST AND SOCIAL PARTICIPATION

	IFLS		SUSENAS	
	log(trust)	log(participation)	log(trust)	log(participation)
RDD-estimate	0.008	0.087	0.017	0.021
P-value small	0.332	0.468	0.149	0.504
P-value large	0.327	0.474	0.15	0.504
Obs-left	808	808	453	453
Obs-right	787	787	492	492
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

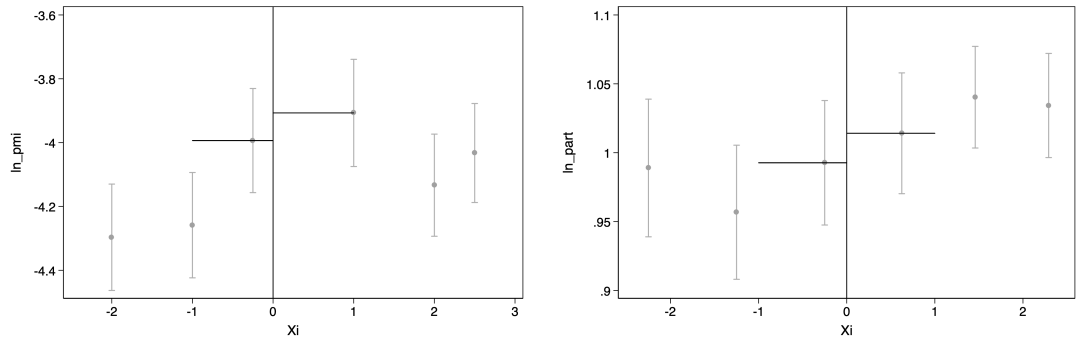
Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. All estimates include only individual who ever entered junior high schools in the 13 provinces of IFLS coverage for both IFLS and SUSENAS estimates.



(a) IFLS (b) SUSENAS

FIGURE 4.3 – EFFECTS OF THE P4 TRAINING ON TRUST

Note: Both figures plot the trust index (trust in neighbourhood and village environment) on running variable using IFLS data and SUSENAS data respectively with `rdplot` command. The plot implements polynomial of degree zero or `p(0)` and bandwidth/window equals to one or `h(1)`. Dots represent the average value of the index by each bin or "mass point" of the running variables. The solid lines indicate the fitted values from a local polynomial specified and the grey lines are the 95% confidence interval.



(a) IFLS (b) SUSENAS

FIGURE 4.4 – PROGRAMME EFFECTS ON SOCIAL PARTICIPATION

Note: Both figures plot the community participation score on running variable using IFLS data and SUSENAS data respectively with `rdplot` command. The plot implements polynomial of degree zero or `p(0)` and bandwidth/window equals to one or `h(1)`. Dots represent the average value of the index by each bin or "mass point" of running variables. The solid lines indicate the fitted values from a local polynomial specified and the grey lines are the 95% confidence interval.

4.6.3 Long-term effect

Figure 4.3 and Figure 4.4 display the long-term effect on trust and participation which indicate a positive program's effect on trust and social participation. However, the estimates of Table 4.3 shows no long-term program effect as none of these coefficients is statistically significant both using IFLS and SUSENAS data. These results are not surprising since earlier we observe a minor effect on outcomes in the intermediate-term. It seems that the minor positive effect of the state ideology indoctrination courses on cognitive aspect in the intermediate-term is not enough to promote individual trust in the long-term. Clearly, insignificant effect in the intermediate-term on social skills leads to no effect in the long-term for social participation.

4.6.4 Possible heterogeneous effects

In this section, I first divide school into public and non-public school for examining the effectiveness of the program. As aforementioned, the compliance in the implementation of the state ideology indoctrination courses might differ between public

and non-public schools. This public and not-public school grouping could also be a proxy for different parental investment toward children education.

Second, I group the samples into female and male groups. Third, I check whether the impact of state ideology indoctrination courses would be different for those living in rural (typically rather homogenous environment) and those in urban (typically more heterogeneous environment) areas. Finally, I also observe whether the impact of the program would be different in regions with some aspiration of independence during the New Order era, representing regions with relatively lower trust to the central government. For this last case, I observe the impact of the program in Aceh and Papua provinces.

Panel A of Table 4.4 shows the intermediate-term effect by school admin–type on cognitive and non-cognitive outcomes. The estimates results suggest no difference between the two types of school admin in regard to cognitive (PMP score) and non–cognitive (social skills index). The coefficients on cognitive outcome remain statistically significant and each point estimate's magnitude are close to the point estimate with full sample. Similarly, coefficient on non–cognitive outcome remain statistically insignificant as in the full sample estimates.

Panel B of Table 4.4 shows the heterogenous long-term effect by gender. Despite the tendency of higher effect for female than male, the coefficients are not statistically significant. The estimates suggest no program effect–difference by gender. Panel C of Table 4.4 presents the heterogenous effect by location whether in urban or rural. I consider that the environment in the rural area with a homogenous community could make the individuals easier to maintain trust level than in a heterogeneous environment of the urban area. Similar to the result of effect by gender. The estimates indicate such tendency, but the coefficients are statistically insignificant.

The specific factor that is hypothesised to become an offsetting factor is being the resident of Aceh and Papua Provinces. The estimates in Table 4.5 indicate to support the hypothesis. Overall signs are negative which indicates an adverse effect of the courses. The reversed sign might suggest the backlash effect. However, the coefficients are also remaining statistically insignificant.

TABLE 4.4 – HETEROGENOUS EFFECTS

Panel A

	Public school		Non-public school	
	log(PMP score)	log(soc. skills)	log(PMP score)	log(soc. Skills)
RDD-estimate	0.055	0.016	0.093	-0.004
P-value small	0.005***	0.408	0.000***	0.635
P-value large	0.007***	0.404	-	0.62
Obs-left	146	157	83	651
Obs-right	158	157	76	630
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Panel B

	Male		Female	
	log(trust)	log(participation)	log(trust)	log(participation)
RDD-estimate	0.001	0.144	0.020	-0.035
P-value small	0.884	0.340	0.178	0.854
P-value large	0.891	0.348	0.182	0.844
Obs-left	517	517	291	291
Obs-right	492	492	295	295
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Panel C

	Urban		Rural	
	log(trust)	log(participation)	log(trust)	log(participation)
RDD-estimate	0.008	0.071	0.012	0.120
P-value small	0.479	0.693	0.305	0.452
P-value large	0.483	0.703	0.299	0.456
Obs-left	397	397	408	408
Obs-right	359	359	423	423
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. All estimates include only individual who ever entered junior high schools in the 13 provinces of IFLS coverage. The observations by subsample are different with regard to remaining number of observation within $W_0[-1, 1]$ by category of school administration, gender and location (rural/urban). The largest drop is in school administration type division due to a lot of missing responses.

TABLE 4.5 – PROGRAMME EFFECT IN ACEH AND PAPUA PROVINCE

	Aceh		Papua	
	log(trust)	log(participation)	log(trust)	log(participation)
RDD-estimate	-0.007	-0.001	-0.060	-0.101
P-value small	0.819	0.993	0.133	0.250
P-value large	0.796	0.995	0.16	0.268
Obs-left	49	49	53	53
Obs-right	51	51	66	66
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. The estimates use SUSENAS data since IFLS surveys do not cover these provinces. Papua consists of Papua and West Papua Provinces.

4.6.5 Robustness tests

To check the robustness of the results, I employ a set of standard strategies in an RD with local randomisation approach. It comprises of predetermined outcomes and placebo outcome balance–test, the density of the running variable–test, and the placebo cut-off–test. I do not perform the sensitivity to window choice–test since the window selected is the lowest one and no window smaller than W_0 in the analysis. In addition to these procedures, I also use two datasets of IFLS–5 and SUSENAS of Social and Cultural Module 2012 to check for consistency of the results.

The idea behind the predetermined outcomes test is that there should be no systematic differences between treated and control group concerning outcomes before the treatment at the cut-off. Proving such condition is necessary to show that the treatment or the programme could not have affected these variables. In a local randomisation approach, both predetermined covariates and placebo outcome analysis are analysed within W_0, the window that is being used in the primary analysis (Frandsen, 2017). Table 4.6 shows the predetermined covariates–test, and we can infer that most of these covariates when the subject was 12 years old are not statistically different relative to the control group. The only exception is the number

TABLE 4.6 – PREDETERMINED COVARIATES–TEST

Panel A - Household condition

Dep. Vars.:	# of room	HH size	Live w mother	Live w father
RDD-estimate	0.042	0.107	0.019	0.002
P-value small	0.635	0.363	0.216	0.930
P-value large	0.645	0.354	0.25	0.941

Panel B - Number of brothers/sisters

Dep. Vars.:	# older brother	# older sister	# younger brother	# younger sister
RDD-estimate	0.056	0.051	-0.012	0.016
P-value small	0.298	0.330	0.780	0.718
P-value large	0.325	0.356	0.799	0.708

Panel C - Proxy for wealth

Dep. Vars.:	Have electricity	Have piped water	Own toilet	Have up to 25 books
RDD-estimate	-0.037	-0.017	-0.011	0.002
P-value small	0.061*	0.444	0.672	0.930
P-value large	0.054*	0.481	0.693	0.941
Obs-left	666	666	666	666
Obs-right	650	650	650	650
Window-left	-1	-1	-1	-1
Window-right	1	1	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. The estimates use IFLS–5 data.

of older sister and probability of having electricity that has a statistical difference yet the magnitudes are negligible.

To implement the placebo test, I replicate the RDD-estimate using exit test score at the junior high school for Bahasa and Science subject as the outcome. The requirement for a good placebo outcome is that it occurs after the treatment, but by programme causal mechanism it could not possibly have been affected by the treatment. The exit test, known as *EBTANAS* occurs at the final year of junior high school, three years after the P4 workshop and at best of my knowledge its test design is stable at around cut-off. Also, the Bahasa and Science subjects are the

TABLE 4.7 – PLACEBO OUTCOME—EBTANAS SCORE FOR BAHASA AND SCIENCE

	ln(Bahasa score)	ln(Science score)
RDD-estimate	0.006	0.027
P-value small	0.720	0.178
P-value large	0.740	0.185
Obs-left	293	230
Obs-right	251	237
Window-left	-1	-1
Window-right	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. The estimates use IFLS–5 data. The sample size is smaller than the main estimate due to lower response rate for variables related to *EBTANAS* score.

ones that have no relation to the content of the P4 workshop, unlike other subjects such as *Pancasila* Moral Education (PMP) which is closely related. The insignificant coefficients for Bahasa and Science score in Table 4.7 confirm the results that the state ideology indoctrination courses only affect individual scores for PMP subject.

The third step in the robustness analysis is the running variable density test. In an RD design with discrete running variable—local randomisation approach, the researcher cannot use a standard McCrary (McCrary, 2008) density test which based on a continuity assumption (Frandsen, 2017). Instead, the density test exploits whether the discrete running variable's probability mass function (pmf) satisfies a certain smoothness condition. If yes, then the observed frequency at the threshold has a known conditional distribution and allows the use of mass point adjacent to the cut-off (Frandsen, 2017). The general similarity of the test with standard McCrary density test is that it seeks whether the number of observations at around the cut-off within the window W_0 are roughly similar. Specifically, I use Stata command `rddisttestk` developed by Frandsen (2017) to implement the test.

Figure 4.5 plots the density of observations by running variable and shows the test results. Three chosen value of k which determines the maximal degree of non-

linearity in the pmf that is still considered to be compatible with no manipulation fails to reject the null of no difference (no manipulation). One possible explanation for a dip in the density at $X = 0$ is that the admission to school drops when the Asian financial crises hit in 1998. Thomas et al. (2004) demonstrate that the financial crisis has had a dramatic negative effect on school attendance among young Indonesians. Among 8-13year-olds, the fraction of individuals that were not in school in 1998 was nearly 20% higher. In my sample, Figure 4.6 also shows the junior high schools' admissions drop by about 5% in 1998.

To what extent this crisis effect confounds the impact estimates are twofold. First, the control group are dominated by the student from crisis—survival family. If social capital measures are positively related to the survival, then the impact estimates are overstated. Second, the non-surviving students might postpone their enrolment and enter later which adds the density in the control group. Thus, the control group is contaminated with lower social capital students—assuming that social capital measures are positively related to the survival. This later case reinforces the overstated impact estimates. Given that most of the estimates are not statistically significant, the required correction from this density result, if any, is to revise the coefficients downward.

Last, I implement the placebo outcome test using two artificial cut-offs: 1988 and 2008. These two years are picked up arbitrarily with a gap of ten from original cut-off both above and below it. I expect no effect on the outcomes of interest since at these two cut-offs the probability of treatment assignment does not change. Furthermore, each of artificial cut-off contains observations of treated only (for 1988) and control only (for 2008), respectively. Table 4.8 shows the RDD-estimate with these fake cut-offs. All coefficients are statistically insignificant, including the coefficients on trust and participation outcomes. The coefficients of these outcomes were statistically significant with the real cut-off.

4.6.6 Interpretation

Up to this point, I have documented an empirical assessment to show that individuals' exposure to state ideology indoctrination courses in Indonesia does not have a long-lasting effect on the individual social capital formation. There are two

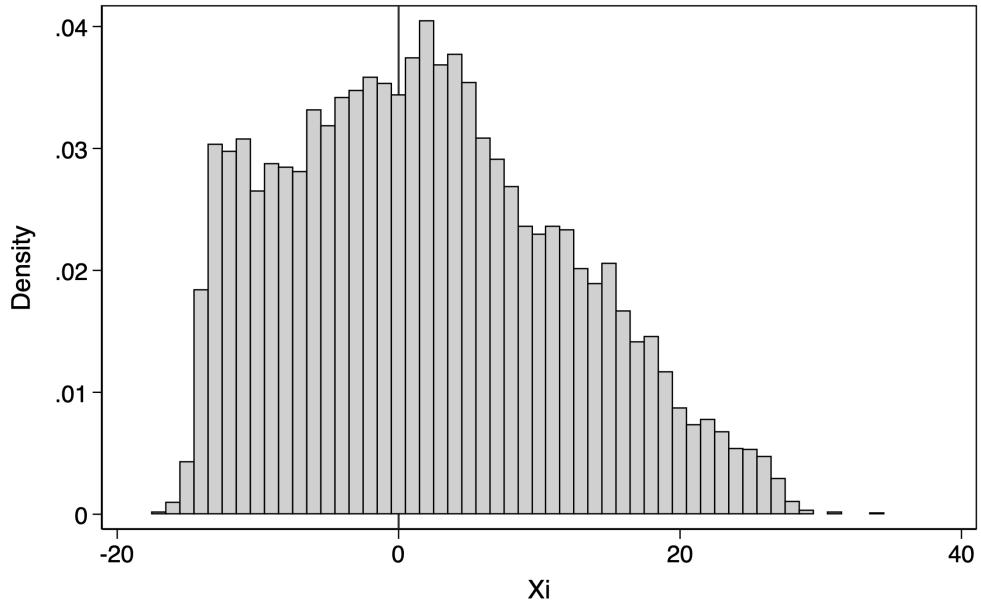


FIGURE 4.5 – DENSITY TEST

Note: The p-value tests are implemented using Stata command `rddisttestk` developed by Frandsen with the chosen $k = 0, 0.01, 0.02$. The larger k represents the mass at the threshold can deviate substantially from linearity before the test will reject with high probability, while a small k means even small deviations from linearity will lead the test to reject with high probability (Frandsen, 2017).

TABLE 4.8 – PLACEBO CUT-OFFS

	cut-off=1988			cut-off=2008		
Dep. Vars.:	log(soc. skills)	log(part.)	log(trust)	log(soc. skills)	log(part.)	log(trust)
RDD-estimate	-0.029	-0.102	0.018	-0.002	-0.166	-0.002
P-value small	0.408	0.828	0.589	0.884	0.317	0.873
P-value large	0.431	0.842	0.591	0.874	0.338	0.88
Obs-left	42	42	42	426	426	426
Obs-right	38	38	38	363	363	363
Window-left	-1	-1	-1	-1	-1	-1
Window-right	1	1	1	1	1	1

Note: ***, **, and * indicate 1, 5, and 10% significant levels, respectively. The estimates utilise `rdrandinf` command developed by Cattaneo et al. (2016) with the default–a polynomial of order zero and use a Kernel type of `uniform` for observations within W_0. The estimates use IFLS–5 data and public school only.

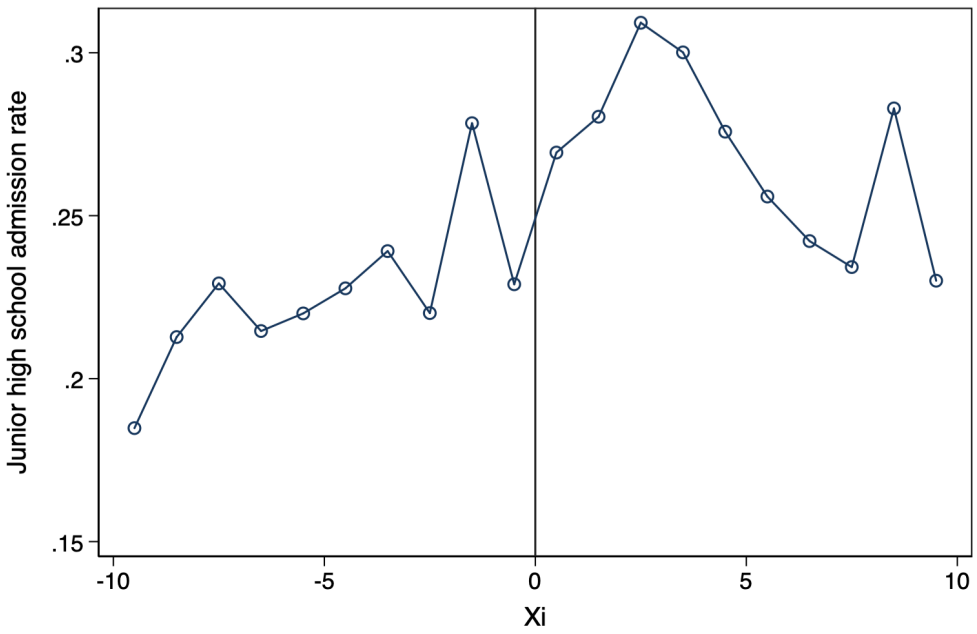


FIGURE 4.6 – ADMISSION RATE (JUNIOR) BY RUNNING VARIABLE

argumentations for this result. The first is the reverse effect of the reform. For the anti-New Order group, the reform in 1998 is a momentum to disregard all the norms and values dictated by the regime. Since it is difficult to identify whether an individual belongs to this group or the opposing group, that of New Order loyalists, and hence, the analysis infers such behaviour to be from regions that hate the New Order the most, that is, Aceh and Papua Provinces as aforementioned.

The second argument is about the programme design. The P4 programme lacks real-life practice for the value and norms taught in the class to be effective. Moreover, the workshop was dominated by discussions and activities such as cognitive-building. The effectiveness to cast a strong effect seems to be weak as the offsetting effect takes place. The heterogeneous analysis of the program effect by location provides tentative support for this argument. Living in a more heterogeneous environment of urban area erodes the program effect quicker than in the rural area.

4.7 Conclusion

This paper aims to test whether individual exposure to the Indonesian state ideology indoctrination courses affects the relevant short–run outcomes and whether the program effect lasts to influences individual social capital formation in the long run. Using both the IFLS–5 data and the SUSENAS data, the empirical analysis exploits the sudden and unexpected termination of the program in 1998 as a Regression Discontinuity Design setting.

The results suggest that the program effect does not last in the long run to affect individual social capital measured by trust and social participation. While the training increased cognitive score related to the program, it did not alter the personality traits related to social skills. The measures of the big five factors of personality namely agreeableness, extraversion, openness, consciousness and emotional stability are not statistically different between the treatment and the control groups. The results also suggest that a combination of the course itself and the real–life facilitating environment could ensure that the program is more effective than only exposure to the course.

This chapter, hence, concludes that the role of state ideology indoctrination courses of the type experienced in Soeharto's Indonesia on the long–run individual social capital formation is limited. It could be effective for promoting bridging social capital at the cognitive level. A combination of intense cognitive learning and a supportive environment might improve the program effectiveness. In general, however, such an indoctrination approach will not be a valid approach to form individual social capital, despite a significant amount of resources dedicated to prepare and train the instructor for the program as well as to implement the program itself. I hope that this finding could contribute to the debates whether a government can develop social capital through education.

Appendix

4.A Additional tables and figures

4.A.1 Effect of the P4 training on five factors—social skills

This section provides tables mentioned in the main text for adding information and some estimate details.

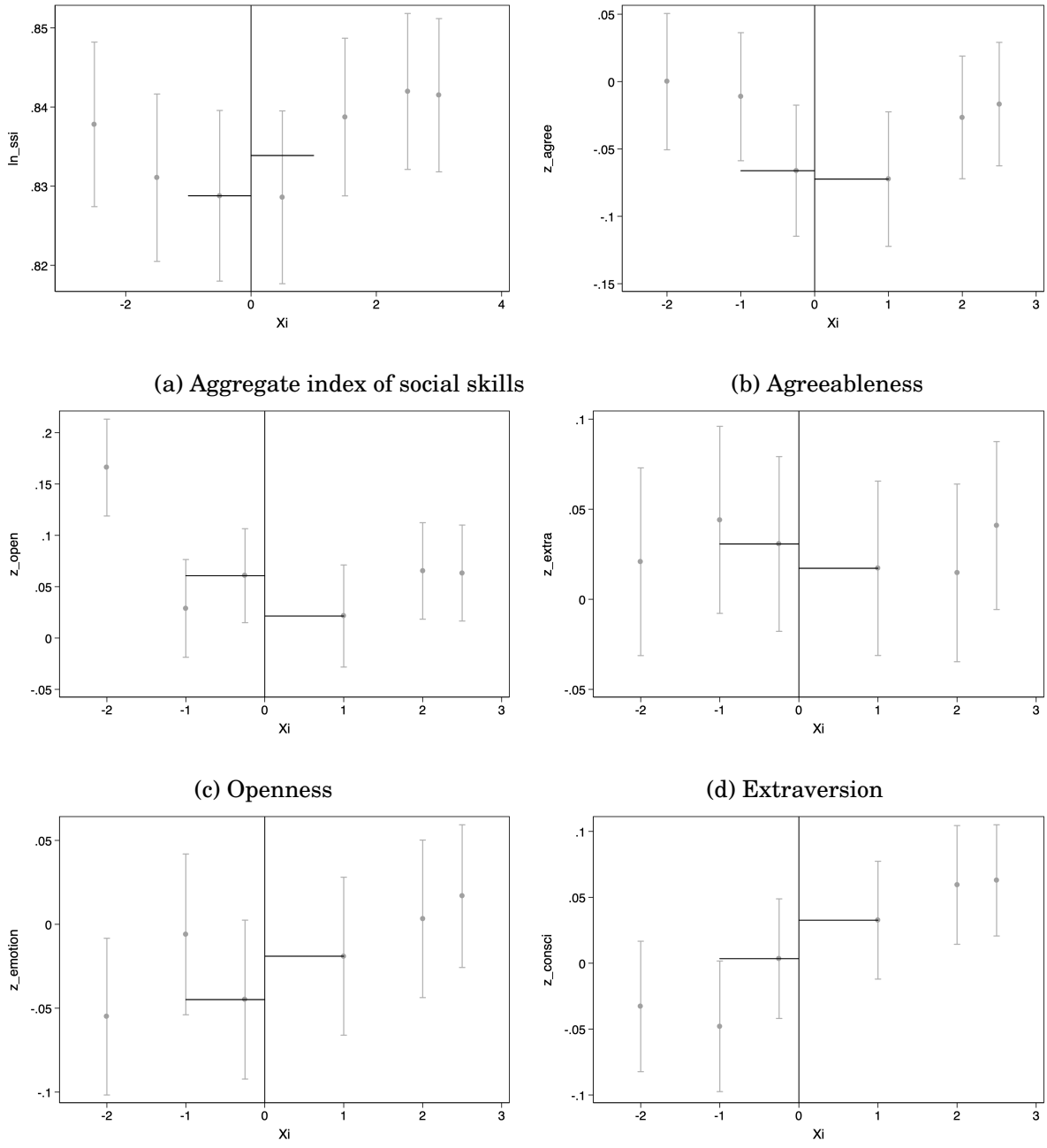
The RD-plots of Figure 4.7 on every five factors of social skills—Panel (b) to (f) indicates that consciousness, extraversion, and emotional stability have a positive impact and agreeableness and openness have a negative impact. The estimates in Table 4.9 confirm these directions, but none of these coefficients is statistically significant.

TABLE 4.9 – EFFECT OF THE P4 TRAINING ON FIVE FACTORS—SOCIAL SKILLS

Dep. Vars.:	Agreeableness	Openness	Extraversion	Consciousness	Emotional stability
RDD-estimate	-0.006	-0.039	-0.014	0.029	0.026
P-value small	0.861	0.254	0.699	0.368	0.447
P-value large	0.862	0.261	0.723	0.385	0.444
Obs-left	667	667	667	667	667
Obs-right	651	651	651	651	651
Window-left	-1	-1	-1	-1	-1
Window-right	1	1	1	1	1

4.A.2 Balance test on memory test score

Table 4.10 shows the balance test between treatment and control group at around cut-off. The t-test fails to reject the equality of the mean between the two groups



(a) Aggregate index of social skills

(b) Agreeableness

(c) Openness

(d) Extraversion

(e) Emotion stability

(f) Consciousness

FIGURE 4.7 – EFFECT OF THE P4 TRAINING ON THE BIG FIVE PERSONALITY FACTORS

over variables memorising word-score and portion of individual who correctly answer the current date. Hence, the potential bias owing to the measurement error due to mis-remember the year entering junior high school, if any, is negligible.

TABLE 4.10 – BALANCE TEST—COGNITIVE CAPACITY

	Control		Treatment			
Variable	Mean	Obs.	Mean	Obs.	Diff.	P-value
Memorizing words-score	5.793	667	5.685	651	0.108	0.200
Accuracy about date	0.982	667	0.992	651	-0.010	0.321

Chapter 5

Conclusion

Two chapters (Chapters 2 and 3) in this thesis provide empirical analyses about a livelihood diversification strategy, namely, having an alternative livelihood and migrating from rural–to–urban areas, and its consequence on contemporary development outcomes, which are food security, earnings, and mental health. As a possible means for improving livelihood, another chapter considers the possibility of developing social capital at the individual level through education. The specific context of the issues addressed in the first two papers (Chapter 2 and Chapter 3) are about acknowledging the food insecurity in the small remote islands and internal migrant economic assimilation in the less restrictive environment of Indonesia. The context of the issue examined in the third paper (Chapter 4) considers the possibility of improving livelihoods by creating social capital at the individual level through indoctrination education. The findings reveal significant consequences for policy.

In general, diversifying the livelihood affects development outcomes positively. Chapter 2 provides empirical evidence that having an alternative livelihood matters for food entitlement of people living in remote areas. Concerning the case of study, a geographical context of small islands, the result suggests a moderate impact of additional income from an alternative livelihood on household perception on food security. Chapter 3 reveals that by migrating from rural areas to urban areas, internal migrants not only can earn better but can also sustain better relative earnings than the natives. Although our expectation of education might be a good place to develop social capital, Chapter 4 shows that a massive effort to develop

social skills during adolescence through indoctrination education as observed in Indonesia's Soeharto era was not effective to cast individual social skills.

Each chapter's result contributes to the literature in each theme. First, my case of study in the Kei island provides an additional empirical result to the literature of acknowledging food insecurity problem by territorial basis. I show that, for people living in the small islands, additional income matters for their feeling toward food security improvements. Second, the analysis of economic assimilation of Indonesian rural-urban migrants adds variety to the existing finding on internal migration dynamics literature in the developing countries. I show that under the less-restrictive policy, in general, migrants outperform their counterpart of non-migrants in the labour market. The archipelagic setting which entails higher cost-of migration, however, still creates a hurdle for migrating. Inter-island migrants are less benefited from the migration process. Last, the investigation on education as a mean for social capital formation contribute to the non-market return on education and nation-building literature. Indonesian case shows that special education at the time of adolescence in a non-democratic system is less effective to develop social capital at the individual level.

In addition, some lessons learned from the case studies, as well as policy consequences, emerge. First, the impact magnitude that I found in the laboratory experiment in the field of Chapter 2 emphasises one direct and indirect consequence. The direct one is that, in general, actions to promote any additional income, such as through an alternative livelihood, are a desirable means to improve food security. A more specific study to test what types of alternative livelihood yield the most efficient impact is beyond the scope of my research, and it is one of the directions for future research. Further, the indirect consequence is that the impact magnitude suggests revising the amount of social assistance upwards (e.g., cash transfer) for achieving SLs by eradicating the hunger experience for the lowest–income group of the context of the population. In general, the finding implies acknowledging the different rate on a regional basis of any income intervention in eradicating hunger. However, the results have a limited context of generalisation, which applies only to a population similar to that of the present study.

Second, the results of Chapter 3 show that diversifying livelihood by migrating

is a viable strategy and imply two critical values about migration policy. The accentuation of the analysis is to distinguish the assimilation process of the rural–urban migration in a place with less restriction towards internal migrants with those of more restrictive ones. First, allowing free movement of people across places, which implicitly eases livelihood diversification, leads to the migrants having superior labour–market outcomes persistently. Although I found a subnational variation of the case, Indonesian rural–urban migrants tend to exhibit persistent higher earnings (relative to the urban natives) after their arrival in cities. Second, unintended consequences might arise along with the superior achievement in the labour market, such as a detrimental effect on the mental health condition. Identifying affirmative policies to address this side effect is beyond the scope of this research, and I leave it for future research.

Third, to enrich the analysis of social capital formation, in Chapter 4, I provide empirical evidence that special education might have limited ability to develop social skills at the individual level. The Indonesian case shows that massive indoctrination and correct timing during the lifecycle (i.e., adolescence) are not sufficient for the course to significantly affect individual social skills. A practical policy response emerging from the analysis is that in designing any similar programme in the future, the real–life practicality of the norms and values taught for developing personal social capital through education must be considered.

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Supplementary Materials

Supplement 1

This supplementary section is related to Chapter 2 of the main text.

The food insecurity scale

Model and framework

The household food security measure in this chapter uses the Food Insecurity Experience Scale (FIES) derived from the HFSSM module. The scale reflects answers to set questions on subjective, and experience-based observation on household food insecurity and hunger that resulted from financial resource constraint during the past 12 months (Radimer et al., 1990). The questions are designed in a sequence to capture the severity level of hunger experience, which hypothetically has some stages.

The stage starts with feeling anxiety about running out of food, originating from financial constraints (Q2, Q3). The next stage indicates a higher level of food insecurity, which is the perception of inadequacy in the quality or quantity of food eaten by household members (Q4). Then, the stage of household food insecurity worsens, which is the adjustment of normal use of food, such as substituting with fewer and cheaper food items than those usually consumed (Q5, Q6, Q7). The ultimate stage following this deterioration of food security condition is instances of reduced food intake by adults with the physical sensation of hunger or loss of weight (Q8, Q9). For households with children, the questions are extended to capture similar stages for children in the family (Q10–Q16). Thus, the order of questions from Q2 to Q16 suggests monotonicity of food insecurity *severity*.

In summary, the responses to the questions are coded as binary for affirmative answers (1 = Yes and 2 = No) or on a Likert scale for severity answers (e.g., 1 = Often, 2 = Sometimes, and 3 = Never). The aggregation of the responses into a scale uses two approaches: simple sum and a Rasch scale. The simple sum approach puts the same weight on each question and does not consider the order of severity. Conversely, the Rasch scale weights each question based on its "difficulty" level. The Rasch model is one of the IRT models that estimate the latent value of individuals corresponding to their affirmation of a set of questions. IRT is becoming the dominant framework for measurement in many social sciences, and in particular, in psychology and educational testing (Ballard et al., 2013). Unlike the standard linear scaling, such as principal component analysis, IRT is more appropriate for the underlying data that have binary responses in nature. Further, the use of nonlinear scaling is also suitable for the non-normally distributed error variance assumption.

In education research, the main use of the IRT model is to determine how an individual with a certain ability level will respond to an item associated with a particular difficulty level. Specifically, in a Rasch model, which is known as the **one-parameter logistic model**, the probability that a subject with ability A_i responds correctly to a test item m characterised by difficulty level D_m is modelled as a logistic function of the distance between A_i and D_m:

$$Pr(Y_{im} = 1|A_i) = \frac{exp(A_i - D_m)}{1 + exp(A_i - D_m)} \tag{5.1}$$

An application of the model to the measurement of food insecurity severity interprets the A_i parameters as reflecting the severity associated with the experience captured by the different questions and of the D_m parameters as the measure of the level of food insecurity experienced by household i. I implement the Rasch model on the survey data using a set of 15 questions as used by Hackett et al. (2008).

Two important assumptions must be made to ensure that the IRT estimation is valid. First is the assumption of conditional independence, which states that the probability of affirming one experience by a respondent, conditional on his or her food insecurity level, does not depend on whether or not he or she has affirmed other experiences, or on whether or not other respondents have affirmed the same

experience (Ballard et al., 2013). To test this assumption practically, we expect to observe a similar fit of superimposing test characteristic curve and the items' empirical proportions. Second is the assumption of unidimensionality, which suggests that all items used contribute in the same way to the underlying latent trait. This later assumption is fully satisfied given that the questions asked are related to food insecurity experiences and are coded consistently for each response.

The Rasch model

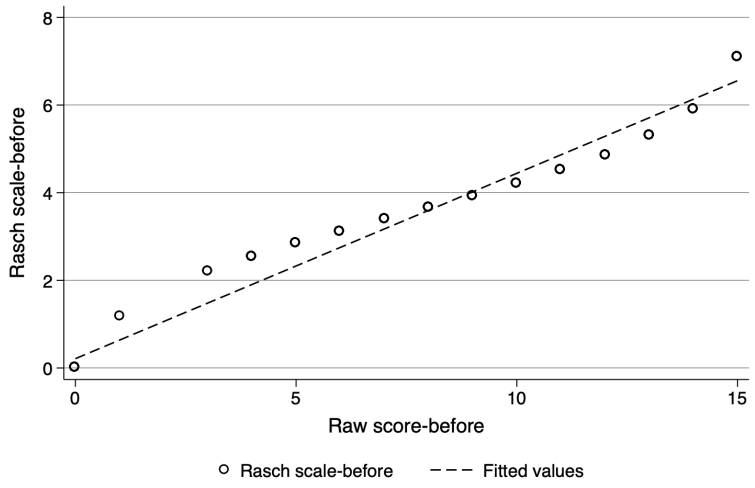
1 Imputing the missing responses

To calculate the Rasch scale of the food security experience scale, I implement the following steps. First, to fit the data to the Rasch model, I uniformly recode the answers to the questions Q2 to Q16 into binary responses. The answers that are originally coded 1 = Yes and 2 = No are recoded into 1 = Yes and 0 = No. The answers that have a value of 1 = Almost every [...], 2 = Some [...] but not every [...] and 3 = Only one or two [...] are recoded 1 = Almost every or Some [...] and 0 = Only one or two [...]. Similarly, answers that have a value of 1 = Often true, 2 = Sometimes true, and 3 = Never true are recoded 1 = Often true or Sometimes true and 0 = Never true (Hackett et al., 2008).

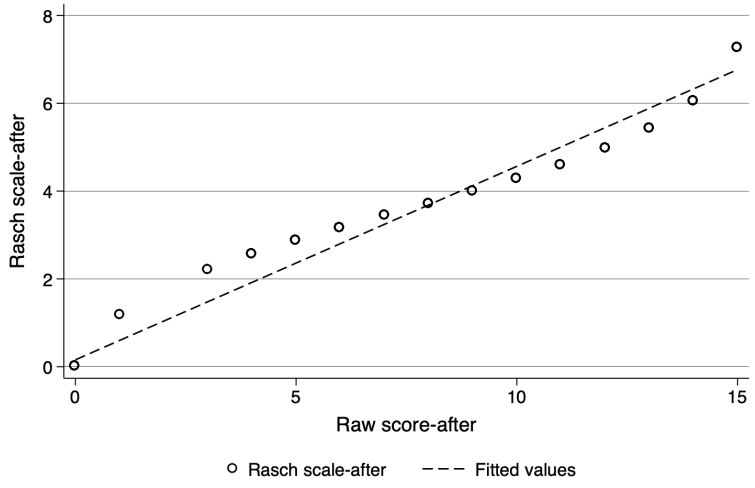
The Rasch model requires a nonmissing response for each item used in the model. Unfortunately, the raw data from the survey are quite spotty regarding the fillings and the compliance expected from the chain set in the questionnaire (see, e.g., the condition in Q4 Part H) I acknowledge that this problem is because of fatigue from answering the lengthy questions. To fill in the missing responses, I follow the procedure of imputing missing values in the Rasch model by implementing command *imputerasch* in Stata. The imputation procedure is as follows: The parameters of the Rasch model are estimated on complete data, and then, the missing data are imputed from the estimated probability for every individual to respond to each item (Hardouin, 2008). Table S1 presents the summary statistics for each question in Part H and Part J of its original and imputed value, respectively.

TABLE S1 – SUMMARY OF ORIGINAL (H_*) AND IMPUTED VALUE (IMPH_*) OF QUESTIONS Q2 TO Q16

Question code	Mean	SD	Count of nonmissing	Imputed question code	Mean	SD	Count of nonmissing
H_P2	0.58	0.49	530	impH_P2	0.59	0.49	533
H_P3	0.53	0.5	529	impH_P3	0.53	0.5	533
H_P4	0.58	0.49	531	impH_P4	0.58	0.49	533
H_P5	0.45	0.5	520	impH_P5	0.46	0.5	533
H_P6	0.49	0.5	519	impH_P6	0.5	0.5	533
H_P7	0.58	0.49	520	impH_P7	0.59	0.49	533
H_P8	0.58	0.49	513	impH_P8	0.59	0.49	533
H_P9	0.48	0.5	341	impH_P9	0.55	0.5	533
H_P10	0.5	0.5	491	impH_P10	0.51	0.5	533
H_P11	0.55	0.5	490	impH_P11	0.55	0.5	533
H_P12	0.38	0.48	489	impH_P12	0.39	0.49	533
H_P13	0.52	0.5	479	impH_P13	0.53	0.5	533
H_P14	0.5	0.5	472	impH_P14	0.52	0.5	533
H_P15	0.55	0.5	477	impH_P15	0.55	0.5	533
H_P16	0.58	0.49	479	impH_P16	0.59	0.49	533
J_P2	0.51	0.5	527	impJ_P2	0.51	0.5	532
J_P3	0.47	0.5	518	impJ_P3	0.48	0.5	532
J_P4	0.56	0.5	520	impJ_P4	0.56	0.5	532
J_P5	0.52	0.5	508	impJ_P5	0.52	0.5	532
J_P6	0.55	0.5	513	impJ_P6	0.56	0.5	532
J_P7	0.62	0.49	512	impJ_P7	0.62	0.49	532
J_P8	0.63	0.48	511	impJ_P8	0.62	0.48	532
J_P9	0.41	0.49	309	impJ_P9	0.55	0.5	532
J_P10	0.48	0.5	485	impJ_P10	0.48	0.5	532
J_P11	0.52	0.5	487	impJ_P11	0.52	0.5	532
J_P12	0.35	0.48	487	impJ_P12	0.38	0.48	532
J_P13	0.57	0.5	469	impJ_P13	0.58	0.49	532
J_P14	0.56	0.5	467	impJ_P14	0.57	0.5	532
J_P15	0.58	0.49	473	impJ_P15	0.59	0.49	532
J_P16	0.63	0.48	472	impJ_P16	0.63	0.48	532



(a) Rasch and raw scales before the treatment



(b) Rasch and raw scales after the treatment

FIGURE S1 – CORRELATIONS BETWEEN RASCH AND RAW SCALES

2 Predicting the scale using Rasch model

To predict the scale using the Rasch model, I implement *IRT 1PL* command in Stata. This command is comparable with the *raschtest* command. Both commands assume that items vary in difficulty but share the same discrimination parameter. Figure S1 presents the correlation between the predicted Rasch scale using *IRT 1PL* command and the raw score. The discrepancy between the two reflects the weights assigned by the Rasch model to each item.

3 Tests

Item response function

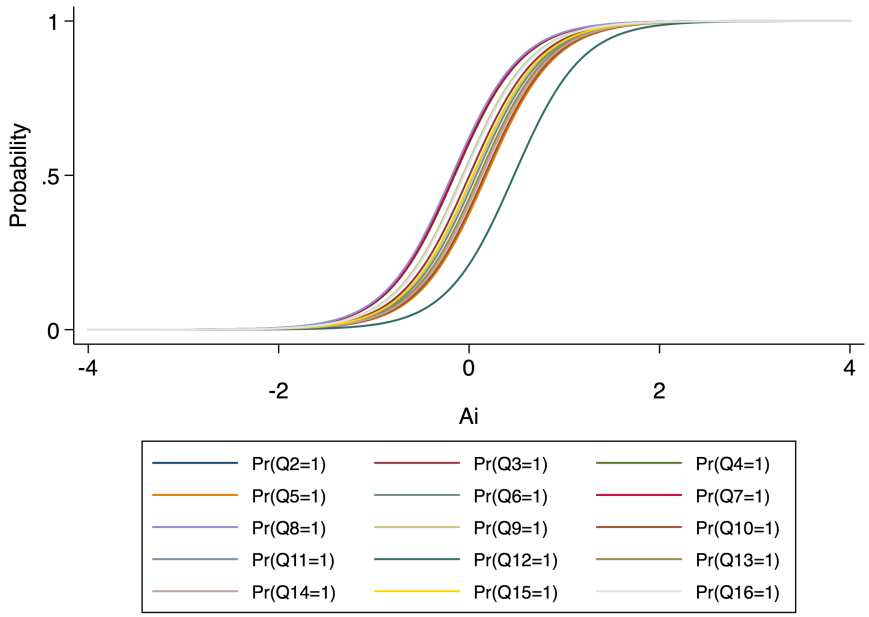


FIGURE S2 – ITEM CHARACTERISTIC CURVE

The main concept in IRT estimates is an item characteristic curve (ICC), also known as item response function. It describes the relationship between the latent trait level and the probability of affirming 'Yes' (success) for an item. In the Rasch model, we assume that the slope of ICC, which is known as the discrimination parameter, is the same across items. The position of each item's ICC along the continuum value of the latent trait shows as the item's difficulty level. Figure S2 describes the estimated values of item difficulty using the data on 533 households in the Kei Islands. The figure plots the ICC according to its difficulty level, with Q8 as the easiest item and Q12 as the most difficult item; see the following verbatim copy of the estimates report for the complete order. The difficulty parameter is shown by coefficients on *Diff* with the absolute value reflecting the difficulty level for each item.

```
. estat report, sort(b) byparm
One-parameter logistic model                    Number of obs     =        533
Log likelihood = -3874.5349
------------------------------------------------------------------------------
             |      Coef.   Std. err.      z    P>|z|     [95\% Conf. interval]
-------------+----------------------------------------------------------------
     Discrim |    2.79416   .1383668    20.19   0.000     2.522966    3.065354
-------------+----------------------------------------------------------------
Diff         |
          Q8 |  -.1786069   .0607153    -2.94   0.003    -.2976067   -.0596071
```

Q2	-.1624043	.0604937	-2.68	0.007	-.2809698	-.0438388
Q7	-.1570323	.0604227	-2.60	0.009	-.2754587	-.038606
Q4	-.1516744	.0603532	-2.51	0.012	-.2699645	-.0333844
Q9	-.0676534	.0594303	-1.14	0.255	-.1841346	.0488279
Q16	-.0522118	.0592961	-0.88	0.379	-.16843	.0640064
Q3	.003733	.0589056	0.06	0.949	-.1117198	.1191858
Q15	.0388723	.0587386	0.66	0.508	-.0762532	.1539979
Q11	.0438679	.0587199	0.75	0.455	-.0712209	.1589567
Q6	.0737315	.0586338	1.26	0.209	-.0411887	.1886517
Q13	.1083736	.0585905	1.85	0.064	-.0064616	.2232088
Q14	.133019	.0585967	2.27	0.023	.0181715	.2478665
Q10	.162519	.0586449	2.77	0.006	.0475771	.277461
Q5	.1821577	.0587016	3.10	0.002	.0671046	.2972108
Q12	.471423	.0617677	7.63	0.000	.3503606	.5924854

The ICC curve reveals that local cultural and linguistic factors might alter the prescribed order of the items' difficulty level, which suggests Q2 as the easiest and Q16 as the most difficult item. In my observation during the survey, the cultural influence that causes such altering is, for example, the habit of fasting. It could conflate the estimate for the true level of the item's difficulty of the question on not eating the whole day for adults (Q8: *Did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?*) or for children (Q16: *Did any of the children ever not eat for a whole day because there wasn't enough money for food?*). These two items' difficulty is ranked among that for the easiest items.

In general, the empirical estimate shows that the difficulty level of items is not well spread (concentrated at around median) along with the value of the latent trait. The only noticeable distinctive value is the difficulty level of Q12—*Our children were not eating enough because we just couldn't afford enough food* ? which stands out at the highest level among other items' difficulty parameters. This, in turn, suggests that having children eat less is the norm for the highest food insecurity status among our sample in the Kei Islands.

Test characteristic curve

The test characteristic curve plots the expected score (sum of the probabilities given the difficulty estimates for each item) and the latent trait. Figure S3 shows the droplines for each expected score of 2, 3 6, and 7, which are the lower bound for each category of food insecurity status. According to the estimate, the expected

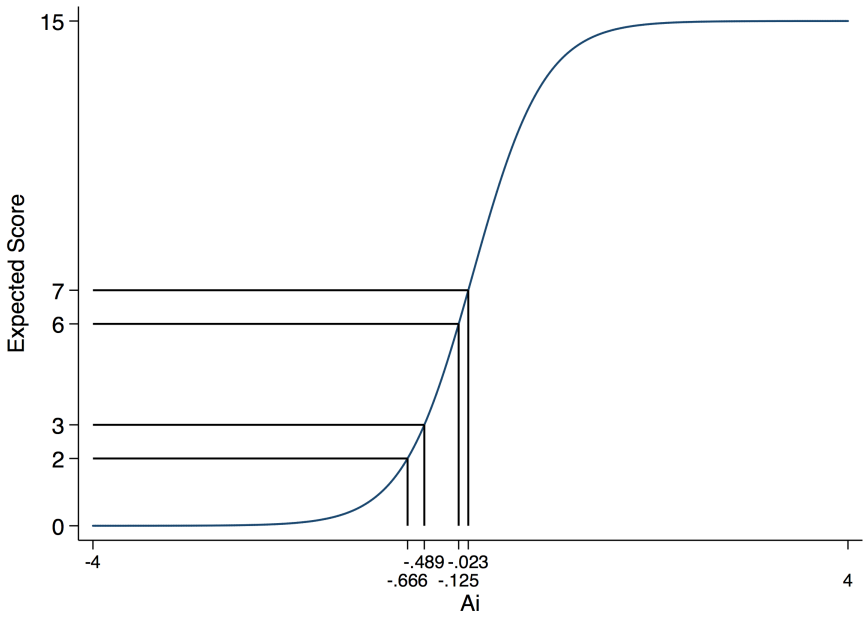


FIGURE S3 – TEST CHARACTERISTIC CURVE

score of 2 corresponds with the latent trait value of -0.666 and the expected score of 7 corresponds with the latent trait value of -0.023.

Invariance and item fit

To check whether the assumption of unconditional independence (invariance) holds, we need to plot the ICC and the items' empirical proportions. The superimposing of the two illustrates that the model fits the data for certain items (e.g., Q3 and Q7) but relatively poorly fits the data for some items (e.g., Q2 and Q6). Assuming that the measurement error might arise from the violation of the invariance assumption, the impact estimate in the chapter relies on the use of an IV to correct the bias originated from this issue.

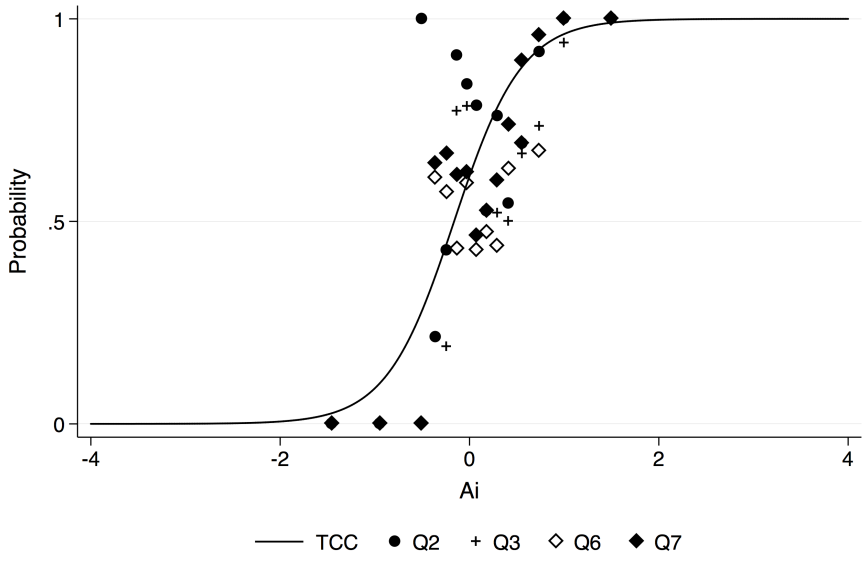


FIGURE S4 – ICC AND ITEM EMPIRICAL FIT

Questionnaire

SURVAI PERIKANAN MASYARAKAT PESISIR DI KEPULAUAN KEI

Kei Islands Coastal Community Food Security and Fishery Survey 2016

Interviewer (full name):

Date of interview (day/month/year):

Time of interview (hh/mm):

Respondent (full name):

Respondent 2013ID:

Village:

Sub-district:

District:

Instructions for enumerators:

- Introduce yourself as a researcher from the University of Pattimura/ Politeknik Perikanan Tual.
- Provide the Information Sheet.
- Explain the purpose of this interview (You can use the Information Sheet). Explain that:
- You are going to ask them about the food eaten in their households and their fishing activity in the last 12 months; and
- This interview is for the purpose of academic research only (not politics or other things).
- Many questions are related to fishing activities in Kei islands over the last 12 months. Guide the respondent patiently to remind them about the period of time we are interested in
- For a multiple choice question, circle the ”number” corresponding to your answer to each question (eg. 1. Yes, 2. No). Where instructed, circle multiple numbers.

PART A COGNITIVE CAPACITY

Now we want to ask you some simple questions.

1. Please mention date, month and year of today (BC calendar)
   Date:☐ Month:☐ Year:☐ Don't know☐
2. Please mention what day is today?
   1. Monday 2. Tuesday 3. Wednesday 4. Thursday 5. Friday 6. Saturday 7. Sunday
3. Interviewer check the answer of date mentioned above:
   1. Correct 2. Wrong
4. Now we will read a list of words consists of 10 words and we will ask you to remember those words as many as possible. We intentionally make a long list so that it is hard for anyone to remember all of the words. Most of people are only remember some of the words. Please listen carefully when we read along the list as we will only read once for each word. When we're done in read them, we ask you to mention as many as words that you are remember and not necessarily in order. Is that clear enough?
5. Interviewer check the list code: A. B. C. D.☐
6. Read these words slowly, about two seconds for each word.
7. Ask the respondent to mention the words and write them down here.

A	B	C	D
HOTEL	LANGIT	GUNUNG	AIR
SUNGAI	SAMUDERA	BATU	MAKAN
POHON	BENDERA	KONFLIK	DOKTER
KULIT	RUPIAH	SUDUT	ISTANA
EMAS	ISTRI	SEPATU	API
PASAR	MESIN	SURAT	TAMAN
KERTAS	RUMAH	GADIS	LAUT
KONFLIK	BUMI	RUMAH	DESA
RAJA	MAKAN	LEMBAH	BAYI
BUKU	MENTEGA	MOBIL	MEJA

A	B	C	D
Total number	Total number	Total number	Total number
of correct words:	of correct words:	of correct words:	of correct words:

PART B IDENTIFY MAIN FISHER

- Identify MAIN fisher in the household. The main fisher is the person who spends the MOST TIME involved in the fishing activity in the household.
- Ask if a spouse can join the interview to answer questions about household?s food situation.

FIRST VISIT

Q1 Are you the main fisher who is most involved in the fishing activity in the household?

1. Yes (go to Q3) 2. No (go to Q2)

Q2 (a) Could I please speak to the main fisher in the household?

1. Yes (go to Q3) 2. No (go to Q2b)

(b) Could I please speak to anyone involved in fishing activities in the household?

1. Yes (go to Q3) 2. No (ask when to come back recommence the survey from Q5)

Date/Time to come back:

Q3 Have you done any fishing in the last 12 months? 1. Yes 2. No

Q4 Can your spouse participate in the interview to answer questions about your household's food situation? 1. Yes (go to Part C) 2. No (go to Part C)

SECOND VISIT (if the contact is made at the first visit, go to Part B)

Q5 Are you the main fisher who is most involved in the fishing activity in the household?

1. Yes (go to Q7) 2. No (go to Q6)

Q6 (a) Could I please speak to the main fisher in the household?

1. Yes (go to Q7) 2. No (go to Q6b)

(b) Could I please speak to anyone involved in fishing activities in the household?

1. Yes (go to Q7) 2. No (ask when to come back and recommence the survey from Q9)

Date/Time to come back: ☐

Q7 Have you done any fishing in the last 12 months? 1. Yes 2. No

Q8 Can your spouse participate in the interview to answer questions about your household's food situation?

1. Yes (go to Part C) 2. No (go to Part C)

THIRD VISIT (if the contact is made at the second visit, go to Part B)

Q9 Are you the main fisher involved in the fishing activity in the household?

1. Yes (go to Q11) 2. No (go to Q10)

Q10 (a) Could I please speak to the main fisher in the household?

1. Yes (go to Q11) 2. No (go to Q10b)

(b) Could I please speak to anyone involved in fishing activities in the household?

1. Yes (go to Q11) 2. No (thank and terminate)

Q11 Have you done any fishing in the last 12 months?

1. Yes 2. No

Q12 Can your spouse participate in the interview to answer questions about your household's food situation?

1. Yes (go to Part C) 2. No (go to Part C)

PART C CHARACTERISING YOUR FISHING OPERATION

Now I am going to ask you questions about your fishing operation.

Q1 How many years have you been fishing? (record the years)☐ years

Q2 How many years have you been fishing in the Kei islands? (record the years)☐ years

Q3 (a) Thinking back over the last 12 months, on average, how many days per week did you go fishing? (probe for days and record **1**, **2**, . . . , or **7**. If nil record **0**)

☐ days per week

(b) On average, how many hours did you spend fishing each day? (probe for hours and record **1**, **2**,. . . If nil record **0**) ☐ hours per day

Q4 (a) Where is your current main fishing area? (read all options out and record one option)

1. Within my own village sea territory 2. Outside my own village sea territory

(b) How many hours did you usually spend travelling to your main fishing area? (probe for hours and record **1**, **2**, . . . If less than 1 hours record **0**)

☐ hours

(c) Did you change the main fishing area during the last 12 months? (record Yes=1, No=2)

1. Yes (go to Q4d) 2. No (go to Q5)

(d) Before you changed your main fishing area, where was your main fishing area? (read all options out and record one option)

1. Within my own village sea territory 2. Outside my own village sea territory

Q5 In the last 12 months, what was the proportion of your household income from different activities? (use Table S2. read each item and record % and confirm that the total is 100%)

TABLE S2 – PART C Q5.

Activities	Percentage(%)
Fisheries	
Food crops	
Horticulture	
Livestock	
Plantation	
Seaweed farm	
Home industry	
Trade	
Services	
Civil servant	
Tourist operation	
Porter labour	
Private work	
Remittance	
Other (specify)	
Total	100%

Q6 Please tell me if you think whether the following factors have negatively affected your fishing in the last 12 months. (read each factor and answer category until terminated in Table S3.)

TABLE S3 – PART C Q6

Factors	Not affected at all	Affected little	Highly affected
(a) Population growth	1	2	3
(b) Fishing by vessels from outside the Kei islands	1	2	3
(c) Tourism development	1	2	3
(d) Deforestation of mangroves	1	2	3
(e) Fishermen from Kei villages	1	2	3
(f) Urban Development	1	2	3
(g) Seaweed and pearl cultivation	1	2	3
(h) Fishing with bomb and poison	1	2	3

Q7 (a) Do you think that the condition of the fish stocks in your fishing grounds is increasing or decreasing over time? (read all options out and record one option)

1. Increasing 2. No change 3. Decreasing

(b) Do you think that the habitat condition in your fishing grounds is getting better or worse over time? (read all options out and record one option)

1. Improved 2. No change 3. Damaged

Q8 What are the two main strategies you take to prepare your household upon your expectation of decline in income? (read all options out and record maximum two options)

(a) Spend more time to catch more fish

(b) Spend more time for agriculture

(c) Spend more time for aquaculture (e.g., seaweed cultivation)

(d) Spend more time for construction services

(e) Spend more time for other activities not listed above (specify)

(f) Spend less money and save more

(g) Move to other villages within the Kei islands

(h) Move out from the Kei islands

(i) Do nothing

(j) I don't know

(k) Other (specify)

PART D CATCH

Now I am going to ask you questions about the fish you caught in the last 12 months. Use Table S4 for Q1 to Q3.

Q1 Please provide a list of species you actually caught in the last 12 months. (read each species and record Yes=1, No=2. record any species not on the list)

Q2 For each species you caught, what was your average catch per trip in the last 12 months? (read each species and record catch in **Bucket** OR **the number of tail** OR **Kg**)

Q3 (a) Of the fish you caught, which one is the most important species for generating your household income? (record **1** for the most important species)
(b) What about the second most important species? (record **2** for the 2nd most important species)

TABLE S4 – PART D Q1-3

Species	Caught	Average catch per trip			Importance
	1. Yes	Record in **Bucket** OR **Tail** OR **Kg**			1. Most important species
	2. No	(Note 1 ton = 1,000 kg)			2. 2nd most important species
	Q1	Q2			Q3
		Bucket	Tail	Kg	
Puri					
Momar					
Komu					
Kawalinya					
Palala					
Lemma					
Sikuda					
Bubara					
Kakapmerah					
Kerapu					
Tenggiri					
Baronang					
Ekor Kuning					
Ikan Terbang					
Kakakutua					
Kembung					
Lainnya					
Lalosi					
Tamimi					
Tembang					
Cumi					
Other (specify)					

Q4 Do you think that your catch amount during the last 12 months has increased or decreased compared to 2 years ago? (read all options out and record one option)

(a) Catch amount increased

(b) Catch amount decreased

(c) Catch amount did not change

(d) I don't know

Q5 Do you think that the species you caught in the last 12 months are different from the species you caught 2 years ago? (read all options out and record one option)

(a) No, the species I caught did not change

(b) Yes, the species I caught in the last 12 months are more valuable

(c) Yes, the species I caught in the last 12 months are less valuable

(d) I don't know

PART E CAPITAL, FISHING EQUIPMENT AND EMPLOYMENT

Now I am going to ask you questions about the fishing equipment you used in the last 12 months.

Use Table S5 for Q1

Q1 (a) Thinking back over the last 12 months, which type of fishing boat did you use? (read each item and record Yes=1, No=2)

(b) For each fishing boat you used, did it have an engine? (read each item used and record Yes=1, No=2)

(c) How many years have you been using these fishing boats? (read each item used and record the years)

(d) Do you own these fishing boats? (read each item and record Yes=1, No=2)

TABLE S5 – PART E Q1

Items	Used	Engine	Years	Own
	1. Yes	1. Yes		1. Yes
	2. No	2. No		2. No
	Q1(a)	Q1(b)	Q1(c)	Q1(d)
Traditional boat 1				
Traditional boat 2				
Traditional boat 3				
Longboat 1				
Longboat 2				
Longboat 3				
Speedboat 1				
Speedboat 2				
Speedboat 3				

Q2 (a) Over the last 12 months, did you use *bagan* for fishing? (record Yes=1, No=2)

1. Yes (go to Q2b) 2. No (go to Q3a)

(b) How many *bagan* did you use in the last 12 months? (record the number of *bagan* used)

☐ (number)

(c) Do you own any of the *bagan* you used? (record Yes=1, No=2)

1. Yes 2. No

(d) How many years have you been using *bagan* for fishing? (record the years)

☐ years

Q3 (a) Over the last 12 months, did you use *rumpon* for fishing? (record Yes=1, No=2)

1. Yes (go to Q3b) 2. No (go to Q4a)

(b) How many *rumpon* did you use in the last 12 months? (record the number of *rumpon* used)

☐ (number)

(c) Do you own any of the *rumpon* you used? (record Yes=1, No=2)

1. Yes 2. No

(d) How many years have you been using *rumpon* for fishing? (record the years)

☐ years

Q4 (a) Thinking back over the last 12 months, what other fishing gears did you use? (read each item and record Yes = 1, No = 2. record any gears not in the list)

(b) How many years have you been using each of these fishing gears? (read each item and record years for each item)

(c) Do you own these fishing gears? (read each item used and record Yes = 1, No = 2)

Q5 Do you think that your fishing equipment you used in the last 12 months has changed compared to 2 years ago? (read all options out and record one option)

(a) Changed to more modern equipment

(b) Changed to more traditional equipment

(c) No change

TABLE S6 – PART E Q4

Items	Used	Years	Own
	1. Yes		1. Yes
	2. No		2. No
	Q4(a)	Q4(b)	Q4(c)
Bubu 1			
Bubu 2			
Bubu 3			
Nets (jaring) 1			
Nets (jaring) 2			
Nets (jaring) 3			
Lines (pancing) 1			
Lines (pancing) 2			
Lines (pancing) 3			
Light 1			
Light 2			
Light 3			

(d) Other (specify)☐

Q6 (a) Thinking back over the last 12 months, how many people, including yourself, were in your fishing boat as paid employees? If the number varies over time, please tell me the average number of people. (record the number of paid employee, if nil record '0')

☐ people

(b) On average, how many people were in your fishing boat as unpaid helpers? (record the number of helpers, if nil record '0')

☐ people

(c) Are you a captain of the fishing boat? (record Yes=1, No=2)

1. Yes 2. No

PART F SOCIAL CAPITAL

Now I'm going to read you several statements that people have made about the situation of your village. For these statements, please tell me your opinion.

Q1

a. *If there is a problem in my village, the people who live here work together to get it resolved.* (read all options out and record one option)

   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree

b. *People in the village where I live are only out for themselves.* (read all options out and record one option)

   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree

c. *I am afraid when I am out alone after dark in my village.* (read all options out and record one option)

   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree

d. *In my village, small groups of people have all the power.* (read all options out and record one option)

   1. Strongly disagree
   2. Disagree

3. Agree
4. Strongly agree

e. *I feel like an outsider in my village.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

f. *There is nothing I can do to solve problems in my village when they happen.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

g. *If I go out in the boat or to work and I need to leave my children I feel safe to entrust them to my neighbour.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

h. *Relationship and trust between fishers and village leaders is good in my village.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

i. *Relationship and trust between fishers in my village and officers at the district fisheries department is good.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

j. *Relationship and trust among fishers in my village is good.* (read all options out and record one option)

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

Now, please tell me your opinion about the following statements.

Q2

a. During the last 12 months, did you have any problem with other marine resource users in your own village? (record Yes=1, No=2)

1. Yes (go to Q2b)
2. No (go to Q3)
3. Don't want to answer (go to Q3)

b. Did the problem involve any violence? (record Yes=1, No=2)

1. Yes
2. No
3. Don't want to answer

c. How many people were involved in the problem? (read all options our and record one option out)

1. Fewer than 2 people
2. Between 3 and 10 people
3. More than 10 people
4. Don't want to answer

d. Is the problem, which occurred during the last 12 months, new or old? (read all options out and record one option)

1. Conflict started this year
2. Conflict started more than 1 year ago
3. Conflict started more than 2 years ago
4. Don't want to answer

Q3

a. During the last 12 months, did you have a problem with other marine resource users outside your own village? (record Yes=1, No=2)

1. Yes (go to Q3b)
2. No (go to Q4)
3. Don't want to answer (go to Q4)

b. Did the problem involve any violence? (record Yes=1, No=2)

1. Yes
2. No
3. Don't want to answer

c. How many people were involved in the problem? (read all options our and record one option out)

1. Less than 2 people
2. Between 3 and 10 people
3. More than 10 people
4. Don't want to answer

d. Is the problem, which occurred during the last 12 months, new or old? (read all options out and record one option)

1. Conflict started this year
2. Conflict started more than 1 year ago
3. Conflict started more than 2 years ago
4. Don't want to answer

Q4

a Have you seen outsiders fishing in the village sea territory in the last 12 months? (probe)

1. Yes (go to Q4b)
2. No (go to Part G)

b. Do you know where they come from? (read all options our and record ALL options)

1. Don't know
2. From other villages in the Kei islands
3. From other areas of Indonesia
4. From other countries

c. How often did you see the outsiders entering the village territory? (read all options out and record one option)

1. Almost every day
2. Once a week
3. Once a fortnight
4. Once a month
5. Less than once a month

d How big was the boat? (read all options out and record ALL options)

1. Smaller than 5m
2. 5-10m
3. 10-30m
4. Larger than 30m

e. Do you think that the occurrence of outsiders fishing in the village territory is increasing or decreasing compared to 2 years ago? (read all options out and record one option)

1. Increasing
2. Decreasing
3. No change

PART G DEMOGRAPHIC

Q1 What is your age?_____ years old.

Q2 What is your gender?

1. Male 2. Female

Q3 What is your ethnic group?

1. Kei
2. Buton
3. Bugis
4. Arab
5. Banjar
6. Other (specify)_____

Q4. How many years have you lived in this village?_____years

Q5. (a) What is your main occupation?

1. Farmer
2. Fisher
3. Home industry
4. Civil servant
5. Private business
6. Trader
7. Services
8. Labour
9. Driver
10. Ojek
11. Other (specify)_____

(b) What is your second occupation?

1. Farmer
2. Fisher
3. Home industry
4. Civil servant
5. Private business
6. Trader
7. Services
8. Labour
9. Driver
10. Ojek
11. Other (specify)

Q6. (a) What is the highest degree you have attained?

1. No formal education
2. Primary school
3. SLTP
4. SLTA
5. Diploma
6. University degree
7. Other (specify)

(b) How many years of formal school education do you have? years

Q7. What is your religion?

1. Christian Protestant
2. Catholic
3. Islam

4. Buddhism
5. Hindu
6. Konghucu
7. Other (specify)

Q8. (a) Other than you, how many people normally live and eat in this household including adults, children and babies? (probe for the number)
Number of people:[ ]years
(b) Of these, how many people are not working? (probe for the number)
Number of people:[ ]years
(c) Of these, how many people are usually involved in fishing activities? (probe for the number)
Number of people:[ ]years

Q9. (a) How long has your household had electricity? (record the years. If no electricity at the household, record '0')
[ ]years
(b) What is your source of electricity? (read all options out and record one option)

1. PLN
2. Village own diesel power generator
3. Village own solar power generator
4. Village own ocean based power generator
5. Your own diesel power generator
6. Your own gasoline power generator
7. Your own solar power generator
8. Other (specify)[ ]years

(c) What is the main problem with your electrical system? (read all options out and record one option)

1. Cost of fuel
2. Maintenance of machinery
3. Availability of fuel
4. Environnemental damage (pollution, noise, etc)
5. No problem
6. Other (specify)

(d) Do you use biomass/organic matter for your household energy needs (e.g., cooking, light)? (record Yes=1, No=2)

1. Yes 2. No

(e) Have you ever heard of renewable energy? (record Yes=1, No=2)

1. Yes 2. No

PART H FOOD SITUATION LAST 12 MONTHS

Respondent: Mother/household member responsible for food

P0. Name of respondent:

These next questions are about the food eaten in your household in the LAST 12 MONTHS. We would like to ask you whether you were able to afford the food you needed.

A household includes father, mother, children (boys and girls) and other persons who live in the same house and eat from the same kitchen for more than 6 months.

Q1. Which of these statements best describes the food eaten in your household in the last 12 months? (read all options out and record one option)

1. Enough of the kind of food we want to eat
2. Enough but not always the kind of food we want
3. Sometimes not enough to eat
4. Often not enough to eat

Now I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for your household in the LAST 12 MONTHS.

Q2. *We worried whether our food would run out before we got money to buy more.* Was that often true, sometimes true, or never true for your household in the last 12 months (record one option)

1. Often true
2. Sometimes true
3. Never true

Q3. *The food that we bought just didn't last, and we didn't have money to get more.* Was that often, sometimes, or never true for your household in the last 12 months? (record one option)

1. Often true
2. Sometimes true
3. Never true

Q4. *We couldn't afford to eat balanced meals.* Was that often, sometimes, or never true for your household in the last 12 months? (record one option)

1. Often true
2. Sometimes true
3. Never true

Go to **Q5a** *if the respondent answered* **1 or 2** *in any of* **Q2-Q4** *OR if* **3 or 4 in Q1**.
In other cases,
Go to Q10 if children under age 18 are present in the household.
Go to Part C if children under age 18 are not present in the household.

Q5. (a) In the last 12 months, since January 2015, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes (go to Q5b)
2. No (go to Q6)

(b) How often did this happen? (read all options out and record one option)

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

Q6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes

2. No

Q7. In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Q8. In the last 12 months, did you lose weight because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Go to **Q9a** *if the respondent answered* **1** *in any of* **Q5-Q8**.
In other cases,
Go to Q10 if children under age 18 are present in the household.
Go to Part I if children under age 18 are not present in the household.

Q9. (a) In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes (go to Q9b)
2. No (go to Q10)

(b) How often did this happen? (read all options out and record one option)

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

Continue to **Q10** *if children under age 18 are present in the household.*
Go to **Part I** *if children under age 18 are not present in the household.*

Q10. Now I'm going to read you several statements that people have made about the food situation of their children. For these statements, please tell me whether the statement was often true, sometimes true, or never true in the LAST 12 MONTHS for your children living in the household who are under 18 years old.

We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food. Was that often, sometimes, or never true for your household in the last 12 months? (record one option)

1. Often true
2. Sometimes true
3. Never true

Q11. *We couldn't feed our children a balanced meal, because we couldn't afford that.* Was that often, sometimes, or never true for your household in the last 12 months? (record one option)

1. Often true
2. Sometimes true
3. Never true

Q12. *Our children were not eating enough because we just couldn't afford enough food.* Was that often, sometimes, or never true for your household in the last 12 months? (record one option)

1. Often true
2. Sometimes true
3. Never true

Go to **Q13** *if the respondent answered* **1** *or* **2** *in any of* **Q10-Q12**.
Go to Part I otherwise.

Q13. In the last 12 months, since January of last year, did you ever cut the size of any of your children's meals because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Q14. (a) In the last 12 months, did any of the children ever skip meals because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes (go to Q14b)
2. No (go to Q15)

(b) How often did this happen (read all options out and record one option)

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

Q15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (record Yes=1, No=2)

1. Yes
2. No

Q16. In the last 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food? (record Yes=1, No=2)

1. Yes
2. No

PART I LIVELIHOOD CHANGE AND RISK PREFERENCE

Respondent: 1. Main Fisher 2. Mother 3. Both (please circle one)

People's fortune and livelihood might change over time due to the uncertain nature of life. On this occasion, we would like to ask you to imagine your future better fortune and livelihood due to a good catch or engaging in another job, resulting in additional income to your current income. To mimic the situation and to help you think about it, we would like to ask you to participate in a livelihood change experiment. Again, this experiment is part of our research. We are interested in understanding how people make decisions. There is no right or wrong decision in this experiment. We would like you to just make a decision that feels right for you.

The experiment, called an *investment game* is as follows:

Initial Capital

We are going to provide you with some initial capital for this experiment.

I have two marbles, blue and yellow. I am going to put them behind my back, shake them and put one in each hand and bring them forward. I have one marble in each hand, concealed. Now, you must pick one hand. If you pick the hand containing the blue marble, the amount of initial capital you have is Rp5,000. If you pick the hand containing the yellow marble, the amount of initial capital you have is Rp20,000.

Q1. Now, please pick one hand. (*record the outcome. do NOT make a payment yet*)

1. Blue (Rp5,000)
2. Yellow (Rp20,000)

Livelihood Change Scenarios

Now, if you invest your initial capital into one of the six alternative livelihood options, you will get the money. How much you can get depends on your initial capital as well as your luck. You choose one of the livelihood options and we will use the

”which hand is it in” game to determine your winnings.

I have two marbles, red and green. I am going to put them behind my back, shake them and put one in each hand and bring them forward. Now, I have one marble in each hand, concealed. Now, you must pick one hand. If you pick the hand containing the red marble you receive the amount of money on the column of Red Marble. If you pick the hand containing the green marble you receive the amount of money on the column of Green Marble.

Finally, I will pay you according to what happened in the experiment. Any money you receive is real money and is yours to keep.

For Q2:

- *Use the first two columns of Table S7 if the respondent got Blue in Q1*
- *Use the last two columns of Table S7 if the respondent got Yellow in Q1*

Q2 . (a) Now, please choose your livelihood option you prefer. (record one option)

1. A 2.B 3. C 4. D 5. E 6.F

(b) Now, please pick one hand. (record the outcome and make payment accordingly)

1. Red 2. Green

Refer to Table S7 to determine the amount of money given to respondent i.e. use first two column of Table S7 if the respondent got BLUE marble (Rp50,000) for the initial capital, and use the last two column in Table S7 if the respondent got YELLOW marble (Rp20,000) for the initial capital

TABLE S7 – INVESTMENT GAME

Scenarios	Low Initial Offer (Rp5,000)		High Initial Offer (Rp20,000)	
	Red Marble	Green Marble	Red Marble	Green Marble
A	Rp5.000	Rp5.000	Rp20.000	Rp20.000
B	Rp4.500	Rp6.500	Rp16.000	Rp25.000
C	Rp4.000	Rp8.000	Rp12.000	Rp30.000
D	Rp3.000	Rp10.000	Rp8.000	Rp35.000
E	Rp2.000	Rp12.000	Rp4.000	Rp40.000
F	0	Rp14.000	0	Rp50.000

PART J FOOD SECURITY NEXT 1 (ONE) WEEK

Now, we want to relate your livelihood change to the questions about the food that will be eaten in your household in the next 1 week, from now, and whether you will be able to afford the food you need in this period. Imagine that the amount of funding from the livelihood change experiment will be your additional monthly income, beside your usual income.

I'm going to read you several statements that people have made about their food situation in the next 1 week. For these statements, please tell me whether the statement will be often true, sometimes true, or never be true for your household in the next 1 week-that is, since last week.

Q1. Which of these statements best describes the food eaten in your household in the next **one** week? (read all options out and record one option)

1. Enough of the kind of food we want to eat
2. Enough but not always the kind of food we want
3. Sometimes not enough to eat
4. Often not enough to eat

Now I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement

was often true, sometimes true, or never true for your household in the next **one** *week.*

Q2. *We worry whether our food will run out before we got money to buy more.* Do you expect this will be often true, sometimes true, or never true for your household in the next **one** week (record one option)

1. Often true
2. Sometimes true
3. Never true

Q3. *The food that we buy will not be enough, and we won't have money to get more.* Was that often, sometimes, or never true for your household in the next **one** week? (record one option)

1. Often true
2. Sometimes true
3. Never true

Q4. *We won't afford to eat balanced meals.* Do you expect this will be often, sometimes, or never true for your household in the next **one** week? (record one option)

1. Often true
2. Sometimes true
3. Never true

Go to **Q5a** *if the respondent answered* **1 or 2** *in any of* **Q2-Q4** *OR if* **3 or 4 in Q1**.
In other cases,
Go to Q10 if children under age 18 are present in the household.
Go to Part C if children under age 18 are not present in the household.

Q5. (a) In the next **one** week, will you or other adults in your household cut the size of your meals or skip meals because there will be not enough money for

food? (record Yes=1, No=2)

1. Yes (go to Q5b)
2. No (go to Q6)

(b) How often will this happen in the next **one** week? (read all options out and record one option)

1. Almost every week
2. Some weeks but not every week
3. Only 1 or 2 week

Q6. In the next **one** week, do you expect you will eat less than you should because there will be not enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Q7. In the next **one** week, do you expect that you will be hungry but won't eat because there will be not enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Q8. In the next **one** week, do you will lose weight because there will be not enough money for food? (record Yes=1, No=2)

1. Yes
2. No

Go to **Q9a** *if the respondent answered* **1** *in any of* **Q5-Q8**.
In other cases,
Go to **Q10** *if children under age 18 are present in the household.*
*Go to***Part I** *if children under age 18 are not present in the household.*

Q9. (a) In the next **one** week, do you expect that you or other adults in your household will not eat for a whole day because there won't be enough money for food? (record Yes=1, No=2)

1. Yes (go to Q9b)
2. No (go to Q10)

(b) How often will this happen? (read all options out and record one option)

1. Almost every week
2. Some weeks but not every week
3. Only 1 or 2 weeks

Continue to **Q10** *if children under age 18 are present in the household.*
Go to Part I if children under age 18 are not present in the household.

Q10. Now I'm going to read you several statements that people have made about the food situation of their children. For these statements, please tell me whether the statement was often true, sometimes true, or never true in the next **one** week for your children living in the household who are under 18 years old.
We will rely on only a few kinds of low-cost food to feed our children because we will be running out of money to buy food. Do you expect this will be often, sometimes, or never true for your household in the next **one** week? (record one option)

1. Often true
2. Sometimes true
3. Never true

Q11. *We won't be able to feed our children a balanced meal, because we won't be able afford that.* Do you expect that it will be often, sometimes, or never true for your household in the next **one** week? (record one option)

1. Often true

2. Sometimes true

3. Never true

Q12. *Our children won't be eating enough because we won't afford enough food.* Do you expect that it will be often, sometimes, or never true for your household in thenext **one** week ? (record one option)

1. Often true

2. Sometimes true

3. Never true

Go to **Q13** *if the respondent answered* **1** *or* **2** *in any of* **Q10-Q12**.
Go to Part I otherwise.

Q13. In the next **one** week, will you cut the size of any of your children's meals because there won't be enough money for food? (record Yes=1, No=2)

1. Yes

2. No

Q14. (a) In the next **one** week, will any of the children skip meals because there won't be enough money for food? (record Yes=1, No=2)

1. Yes (go to Q14b)

2. No (go to Q15)

(b) How often will this happen (read all options out and record one option)

1. Almost every week

2. Some week but not every week

3. Only 1 or 2 week

Q15. In the next **one** week, do you expect that your children will be hungry but you just won't afford more food? (record Yes=1, No=2)

1. Yes

2. No

Q16. In the next **one** week, do you expect that any of the children will not eat for a whole day because there won't be enough money for food? (record Yes=1, No=2)

1. Yes
2. No

PART K HOUSEHOLD EXPENDITURES

The next questions deal with your HOUSEHOLD's expenses.

Q1. About how much did you and your household spend per day on food that you use at home in the LAST WEEK? Include expenditures on drinking water, spices, and cooking oil, and other fuel for cooking (fire woods, kerosene).
[ ] ribu Rupiah

Q2. How much do you and your household spend for cigarettes PER DAY?
[ ] ribu Rupiah

Q3. How much do you and your household spend for alcohols in the LAST WEEK?
[ ] ribu Rupiah

Q4. How much did you and your household spend for mobile phone in the LAST WEEK?
[ ] ribu Rupiah

Q5. How much did you and your household spend for electricity in the LAST MONTH?
[ ] ribu Rupiah

Q6. About how much did you and your household spend on transportation in the LAST MONTH? Include expenditures on public transportation, and if your household owns a motorcycle, include expenditures on gas, repairs and tax.
[ ] ribu Rupiah

Q7. About how much did you and your household spend on health services in the LAST MONTH? Include expenditures on medicine and seeing doctors and nurses.
[ ] ribu Rupiah

Q8. How much did you and your household spend for education in the LAST MONTH? Include expenditure on tuition fees, living costs for children who live outside your home, and school activities.
[ ] ribu Rupiah

Q9. How much did you and your household spend for entertainment in the LAST MONTH? Include expenditure on eating out, drinking with friends, and all other recreational activities.

[ ] ribu Rupiah

Q10. How much did you and your household spend for soap, detergent, and other cleaning equipment in the LAST MONTH?

[ ] ribu Rupiah

Q11. About how much did you and your household spend on loan payments in the LAST MONTH?

[ ] ribu Rupiah

Q12. About how much did you and your household spend on the maintenance of fishing equipment (boat, net, machine) in the LAST 6 MONTHS?

[ ] ribu Rupiah

Q13. About how much did you and your household spend on clothing (including shoes and head covers) in the LAST YEAR?

[ ] ribu Rupiah

Q14. About how much did you and your household spend on ceremonial activities in the LAST YEAR? Include expenditures on religious and cultural ceremonies, parties, circumcision and weddings.

[ ] ribu Rupiah

Q15. About how much did you and your household spend on rent for your house in the LAST YEAR?

[ ] ribu Rupiah

Q16. About how much did you and your household spend in total in the LAST MONTH?

[ ] ribu Rupiah

PART K INTERVIEWER QUESTION

Q1. How confident are you about the accuracy of the respondent's recollection of fishing activities in the last 12 months?

1. Confident
2. Not confident

Interviewer's comments

-

Response report

1. Full response with main fisher
2. Full response with non-main fisher
3. Full refusal
4. Part refusal
5. No fishers in household
6. Other (specify)

Supplement 2

This supplementary section is related to Chapter 3 of the main text.

Summary of sampling details

The survey design and implementation of the RUMiI project is well and comprehensively documented in Resosudarmo et al. (2010). From the documentation, herewith, this section provides some extraction of the sampling details. The primary sampling unit of the survey is big islands-groups representing main enclave of rural–urban migrants. These groups are Sumatra, Java, Kalimantan, Sulawesi and Papua. They have diverse culture, language and socio-economic characteristics. Of these five regions, proportion of rural-urban migrants counted from the 2005 intercensal Population Survey (*Survei Penduduk antar Sensus, or Supas*) provides basis for choosing municipalities or districts as sample locations. In most cases, the largest enclave in each region was selected for the survey with Papua as the excluded region: Medan in Sumatera, Samarinda in Kalimantan, and Makassar in Sulawesi. The reason for not to include Papua is the cost-efficiency problem for conducting survey in Papua. Besides, Tangerang is chosen for Java. Its number of rural-urban migrants is smaller than Jakarta as the primary sampling target. The cost of conducting survey in Jakarta was too high and Tangerang is considered a suitable substitute.

Construction of outcome variables

This section provides the explanation for calculating the mental health score and social support score, the construction of panel setup for RUMiI data apart from the RUMiCI data, a further elaboration why the return (remigration) might not be an issue despite the high attrition in the dataset, and additional tables of estimates.

The mental health score

Table S9 presents the questions used to elicit the mental health problems in the RUMiI surveys. It covers a wide range of dimensions ranging from sleep condition up to feeling fulfilled or not. The questions are available for the first wave (2008),

third wave (2010), and fourth/last wave (2011) but not the second wave (2009). I decide to use data form only the first and last wave in the analysis, and not the other waves, for this reason, in addition to the justification of getting clearer variations for some key variables with a reasonable time gap, that is, four years.

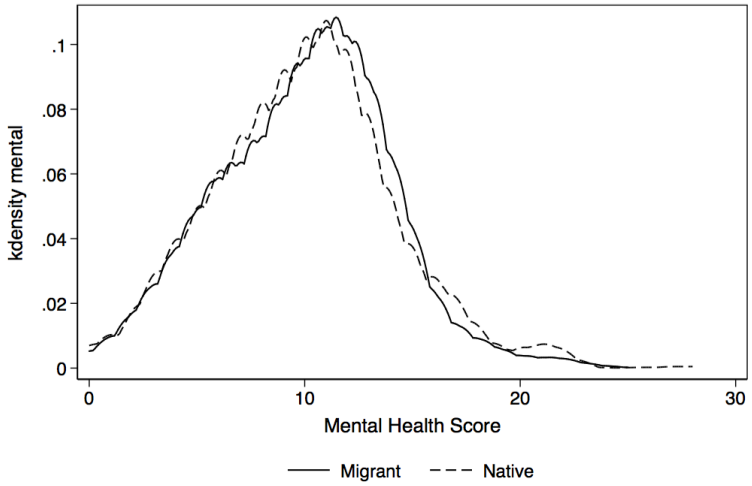


FIGURE S5 – DISTRIBUTIONS OF MENTAL HEALTH SCORE BY MIGRATION

The steps for calculating the mental health score is as follows. First, I reverse the Likert's index of question P01 and P02 to reflect the same scale order with the rest of questions (P03 to P12). Thus, all questions now have the same response of 1 to reflect the best level of the mental health status and 4 to reflect the worst level of the mental health status. Second, I recode the Likert's scale as follows: (1 = 0), (2 = 1), (3 = 2), and (4 = 3) or simply minus one for all index values to comply with the scale as used in Fritjers et al. (2009) for ease of comparison with other studies. Third, I construct a simple equally weighted scale by summing all questions' indices and assigning 0 to the healthiest level and 36 to the worst level of mental health status. Figure S5 shows the distribution of this scale by migration status at baseline (the year 2008). It seems to be normally distributed with the most at around the mean, a clear indication that migrants have a slightly higher score than natives.

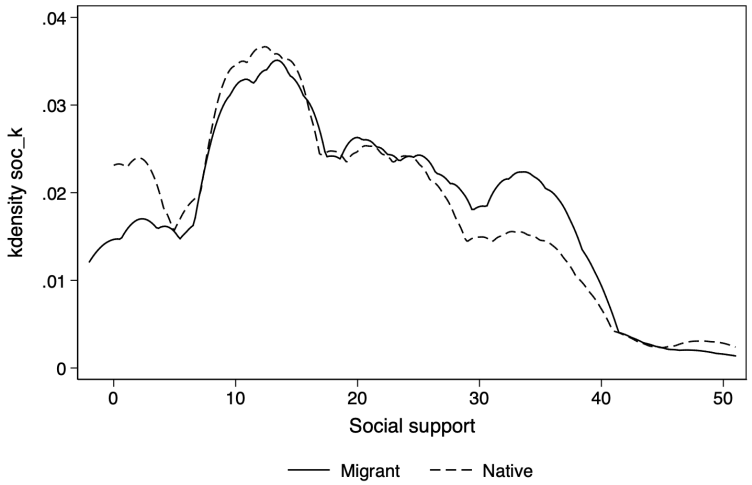


FIGURE S6 – DISTRIBUTIONS OF SOCIAL SUPPORT SCORE BY MIGRATION

The social support measure

The social support variable is measured by utilising two responses from the social networks section of the survey. The first is the answer to the question whether the respondent has been helped by other people. The second is the answer to the question on the education level of the person. From this information, I construct a weighted sum of the number of the network in which the education level of the people in the network is used as the weight. The idea is to weight more people with higher education when helping, despite a low variation if we take the network size at face value. The following simple algebra is used to calculate the social support scale measure:

$$\sum_{k} D_k \cdot EDU_k \tag{5.2}$$

For each column $k \in \{1, 2, 3\}$, respondents affirm whether they have people who have helped them (D = 1 means there is one person and 0 = otherwise) and EDU is the level of education (I convert it into years of schooling) for each person k. The algebra makes 0 the lowest scale in which no one helped and 51 the highest scale (three people in the columns with a postgraduate degree (17 years of schooling)). Figure S6 presents the distribution of this scale by migration status at baseline (the year 2008). It seems to be widely distributed and shows a mixed pattern in terms of whether the scale for migrants is lower/higher than natives.

RUMiCI Panel Setup

The details on the study design and selection of the cities of the RUMiCI surveys are available in Resosudarmo et al. (2010). The study in this chapter is the first to use the panel feature of the Indonesian dataset, that is, RUMiI. Hence, this section explains how to construct the panel data at the household-head level, which is the unit used in the empirical analysis. To append data of all four waves, I unify the household ID, which originally has different coding: five digits of $migration\_id$ (2008), six digits of idr (2009), eight digits of $migration\_id$ (2010) and eight digits of $hhid$ (2011).

The $migration\_id$ (2008) is in the XYYYY format with X denoting city number (1 = Medan, 2 = Tangerang, 3 = Samarinda, and 4 = Makassar) and YYYY denoting the household ID number. The idr (2009) is in the 0XYYYY format with 0X denoting the city in 2008 and YYYY denoting the household ID number in 2008. The $migration\_id$ (2010) is in the XYYYYABC format with X denoting city in 2008, YYYY denoting household ID number in 2009, A is 1 if the household is an additional observation in 2010 and 0 otherwise, B is 1 if the household is formed from any household member in previous waves and 0 otherwise, C is the ID for individuals who become the household head taken from his/her person ID in the previous waves. The hhid (2011) has similar coding as $migration\_id$ (2010). To unify these different household ID formats, I create a uniform code similar to the 2011 code, which is XYYYYABC, and impose 000 for ABC in 2008 and 2009.

TABLE S8 – ATTRITION RATE OF HOUSEHOLD SAMPLES IN RUMII DATA

Waves	2008	2009	2010	2011
Observations	2437	2023	1686	1565
Attrition		414	751	872
Attrition rate		17%	31%	36%

With this uniform format, the new households (additional and split households in 2010 and 2011) are treated as a different entity from their parent households. In the analysis, I only utilise the observation of the original household in 2008. The new households originated from splits (303 households in 2010) and new sample (109 in 2010) do not have base information for 2008, which is required in the

analysis. Table S8 shows the attrition rate of the household samples in RUMiI data, which is considerably high. To test the potential effect of this attrition on the coefficient estimate, I employ several strategies as explained in the main text.

Survey questions

The following table provides questions used to elicit the mental health condition in RUMiI surveys.

Supplement 3

This supplementary section is related to Chapter 4 of the main text.

Survey questions

The following tables list questions to measure social skills attributed to five factors, trust, and community participation in IFLS–5; and social participation, and trust measure in SUSENAS of Social and Culture Module 2012.

TABLE S9 – MENTAL HEALTH QUESTIONS IN RUMICI SURVEYS

Have you experienced the following in the past few weeks?		
<P01>	Can concentrate on a range of tasks	1. Cannot concentrate
		2. Can concentrate sometimes
		3. Can concentrate often
		4. Can concentrate always
<P02>	Do not get enough sleep because of excessive worrying	1. Often not able to sleep well
		2. Sometimes not able to sleep well
		3. Often can sleep well
		4. Always can sleep well
<P03>	A positive attitude to life	1. Very positive
		2. Usually positive
		3. Rarely positive
		4. Usually not positive
<P04>	Capable of making swift decisions	1.Very capable of making decisions
		2.Usually capable of making decisions
		3.Usually not capable of making decisions
		4. Not capable of making decisions at all
<P05>	Often feel depressed	1. Never
		2. Rarely
		3. Often
		4. Very Often
<P06>	Capable of solving problems or difficulties	1. Very capable
		2. Capable
		3. Less capable
		4. Not capable
<P07>	Can enjoy life/daily activities	1.Can enjoy daily activities very much
		2. Usually can enjoy daily activities
		3. Usually cannot enjoy daily activities
		4. Not able to enjoy daily activities
<P08>	Want to solve problems and not avoid them	1. Never avoid problems
		2. Rarely avoid problems
		3. Sometimes avoid problems
		4. Often avoid problems
<P09>	Happy/cheerful	1. Happy (Not unhappy)
		2. Quite Happy (Rarely unhappy)
		3. Less Happy (Often unhappy)
		4. Not Happy (Always unhappy)
<P10>	Am a confident person	1. Very confident
		2. Confident
		3. Less confident
		4. Not confident
<P11>	Feel useful/worthwhile	1. Very useful/worthwhile
		2. Useful/worthwhile
		3. Less useful/worthwhile
		4. Not useful/worthwhile
<P12>	After considering all aspects of life, do you feel fulfilled?	1. Very fulfilled
		2. Quite fulfilled
		3. Rather fulfilled
		4. Not fulfilled

TABLE S10 – QUESTIONS TO ASSESS SOCIAL CAPITAL MEASURE IN IFLS–5 SURVEY

Measures	IFLS–5 Survey Questions
Personal skill factor	how much you agree or disagree with each statement using the following scale
	(1. Disagree strongly 2. Disagree a little 3. Neither agree nor disagree 4. Agree a little 5.Agree Strongly)
Conscientiousness	Does a thorough job.
	Tends to be lazy (reversed).
	Does things efficiently.
Openness to experience	Is original, comes with new ideas.
	Has an active imagination.
	Values artistic, aesthetic, experiences.
Extraversion	Is talkative.
	Is reserved. (reversed)
	Outgoing, sociable.
Agreeableness	Has a forgiving nature.
	Is considerate and kind to almost everyone.
	Is sometimes rude to others (reversed).
Emotion stability	Worries a lot.
	Get nervous easily.
	Is relaxed; handles stress well.
Trust dimension	We want to ask you about trust in this village
	TR01-I am willing to help people in this village if they need it.
	TR02-In this village I have to be alert, or someone is likely to take advantage of me
	TR03-Taking into account the diversity of ethnicities in the village, I trust people with the same ethnicity as mine more.
	TR04-I would be willing to leave my children with my neighbours for a few hours if I cannot bring my children along.
	TR05-I would be willing to ask my neighbours to look after my house if I leave for a few days.
Community part.	We would like to ask you about some community or government activities and programmes that may have taken place in this village during the past 12 months (1. Yes 0. No)
	Community Meeting, Cooperatives, Voluntary Labour, Improve the Village/Neighbourhood, Youth Groups Activity, Religious Activities, Village Library, Village Saving and Loans, Health Fund, PNPM, Political Party, Neighbourhood Security Organisation (*Siskamling*), Water for Drinking System/Supply, System for garbage disposal, Women's Association Activities(PKK), Community Weighing Post (*Posyandu*), Community Weighing Post Lansia (*Posyandu Lansia*)

TABLE S11 – QUESTIONS TO ASSESS SOCIAL CAPITAL MEASURES IN SUSENAS SURVEY

Variable	Question
Social participation	Did you participate in any of the following social activities in the past three months? 1. religious 2. skill 3. sport 4. art 5. saving (arisan) 6. funeral 7. art 8. Other.
Trust [4 = strongly trust; 1 = no trust]	1. In general, do you trust that the head of village do his/her job properly? 2. In general, do you trust that the village leaders can do something to solve community member's problems? 3. In general, do you trust that the religious leader acts as a moral role model in the village? 4. Do you trust your neighbour in entrusting your house when you are away? 5. Do you trust your neighbour in entrusting your children when you are away?